

ADDITIONAL NOTES ON THE GENUS VERBENA. IX

Harold N. Moldenke

VERBENA [Dorst.] L.

Additional synonymy: Glandularia Walt. ex J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2 (2): 920. 1791. Clandularia J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2 (2): 1555, sphalm. 1791.

Additional & emended bibliography: J. Schröder, Pharm. Med. 4: 167--168. 1649; Micheli, Cat. Pl. Hort. Caes. Florent. 98 & 182. 1831; J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2 (1): 20 & 41--42 (1789), ed. 13, pr. 1, 2 (2): 886, 920, & 1555 (1791), ed. 13, pr. 2, 2 (1): 20 & 41--42 (1796), and ed. 13, pr. 2, 2 (2): 886, 920, & 1555. 1796; Re, Fl. Segus. 8. 1805; Re, Fl. Tor. 1: 317. 1825; Tenore, Syll. Pl. Vasc. Fl. Neapol. App. 4: 86. 1831; R. A. Phil., Anal. Univ. Chil. 27: 339. 1865; Ces., Passer., & Gib., Comp. Fl. Ital. 327 (1874) and 895. 1886; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 1, 1: 249, 306, 350, 877, & 1032. 1893; Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 94--97, 599, 603, 617, 618, & 635, fig. 3552--3559. 1913; Hauman, Anal. Soc. Cien. Argent. 86: 150. 1918; Gough, Gard. Book Malaya 248. 1928; Herter, Estud. Bot. Reg. Urug. 8b: 160, 170, & 201. 1933; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 94--97, 599, 603, 617, 618, & 635, fig. 3552--3559 (1936) and ed. 2, pr. 3, 3: 94--97, 599, 603, 617, 618, & 635, fig. 3552--3559. 1943; Cain, Found. Pl. Geogr., pr. 1, 335. 1944; J. A. Clark, Card Ind. Gen. Sp. Var. issues 183--185 (1944) and issue 191. 1945; Savage, Cat. Linn. Herb. Lond. 4. 1945; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 2, 1: 249, 306, 350, 877, & 1032 (1946) and pr. 2, 2: 29, 323, 895, 1161, 1178--1180, & 1248. 1946; Britton & Br., Illustr. Fl., ed. 2, pr. 4, 3: 94--97, 599, 603, 617, 618, & 635, fig. 3552--3559. 1947; J. A. Clark, Card Ind. Gen. Sp. Var. issue 231. 1959; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 3, 1: 249, 306, 350, 877, & 1032 (1960) and pr. 3, 2: 29, 323, 895, 1161, 1178--1180, & 1248. 1960; Frei & Fairbrothers, Bull. Torrey Bot. Club 90: 352. 1963; Turrill in Curtis, Bot. Mag. 174: pl. 409. 1963; Elmore, Monog. School Am. Res. 8: [Ethnobot. Navaj.] 1--136. 1964; Hocking, Excerpt. Bot. A.7: 454--456. 1964; J. A. Clark, Card Ind. Gen. Sp. Var. issues 249 & 251. 1965; Gaiser & Moore, Surv. Vasc. Pl. Lambton Co. 100--101. 1966; J. A. Clark, Card Ind. Gen. Sp. Var. issue 257. 1968; Leandri, Adansonia, ser. 2, 8: 144. 1968; Pollak-Eltz, Anal. Anthropol. Gesell. Wien 98: 51--58. 1968; Muehlenbach, Ann. Mo. Bot. Gard. 56: 169--170. 1969; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 94--97, 599, 603, 617, 618, & 635, fig. 3552--3559. 1970; Bostick, Castanea 36: 206. 1971; Cain, Found. Pl. Geogr., pr. 2, 335. 1971; Stalter, Castanea 36: 174. 1971; Long & Lakela, Fl. Trop. Fla. 733, 735, 740--742, & 961. 1971; P. Duncan in E. R. Hall, Am. Forests 77 (12): 17. 1971; Hocking, Excerpt. Bot. 18 A: 444. 1971; Moldenke, Excerpt. Bot. 18 A: 445. 1971; Zochert, Nat. Hist. 80 (10): [8]. 1971; Farnsworth, Pharmacog. Titles 6 (9): xii

& title 16428. 1971; Rickett, Wild Fls. U. S. 5 (2): [455], 456, & 665, pl. 152. 1971; Moldenke, Phytologia 22: 295, & 298--314. 1972.

Savage states that in the Linnean Herbarium, under genus 35, Verbena, sheet number 14 is inscribed "Surin." with a short diagnostic note at the edge of the sheet, but is otherwise unidentified.

It should be noted that Walter (1788) does not use the name Glandularia, but Gmelin (1791) seems to attribute it to him.

Continuing Thornberry's record (1966) of disease-causing organisms known to attack members of Verbena as a genus in North America: Rhizoctonia solani Kuehn, Sclerotium bataticola Taub., Septoria verbenae Rob., Sphaerotheca humuli (P. DC.) Burr., Thielaviopsis basicola (Berk. & Br.) Ferr., and an unidentified virus. Dennis (1970) adds to this list the fungi, Meliola ambigua Pat. & Gaill. (M. lantanae Syd.) and Cercospora verbeniphila Speg. from unidentified species of Verbena. Cummins (1971) reports the aecia of Aecidium verbenicolum Ell. & Kell. on species of this genus in the United States east of the Rocky Mountains, but then reduces this to Puccinia vilfae Arth. & Holw. Streams, Shahjahan, & LeMasurier (1968) report that Verbena is second only to Erigeron annuus as the favorite host for Lygus lineolatus and Leiophron pallides in Connecticut. Westcott (1971) records the following fungi as infesting native United States species of Verbena: Erysiphe cichoracearum (a powdery mildew, general), Phymotrichum omnivorum (root-rot, Texas), Puccinia aristidae (rust, stages 0 & I, Arizona, stages II & III on grasses), and Puccinia vilfae (rust, stages 0 & I, Indiana to Oklahoma and South Dakota, stages II & III on Sporobolus), and an unidentified virus.

Hunt (1946) reports that a rust, Cronartium flaccidum (Alb. & Schein.) Wint., causes considerable damage to Pinus sylvestris in Europe and is potentially dangerous to our hard pines in America because its uredal and telial stages may be found on a variety of alternate hosts in several plant families, as, for instance, peony, nasturtium, and verbena.

Hyland (1968) lists three unidentified specimens of Verbena collected by Viehmeyer in 1963: no. 303617 from Sedona, Arizona, with "leaves pinnate, showy perennial with lavender flowers"; no. 303618 from Rock Springs, Arizona, "at 3200 feet elevation, with pinnate leaves and lavender flowers"; and no. 303619 from volcanic cinders north of Flagstaff, Arizona, "heat and drought tolerant, with bright lavender flowers". Unfortunately, I have not as yet seen these specimens.

The flowering period of 57 taxa of Glandularia from different latitudinal and altitudinal distribution, mostly from Argentina, were studied by Schnack & Rubens (1970) in an experimental garden. The observed differences are mostly the result of the natural

selection of genotypes adapted to the habitat.

The Becks (1970) report that a population of Archilestes grandis (Odonata, Lestidae) in Oklahoma oviposited in tandem between 9:51 a.m. and 3:45 p.m. entirely on non-aquatic plants, including the stems of Verbena, but at all the sites no fallen prolarvae would have been more than 0.7 m. from water.

Guillarmod (1971) cites Dieter 829, Guillarmod 414 & 1435, and "Layd." s.n. -- the first deposited in the herbarium of the Albany Museum at Grahamstown, South Africa, the Natal Herbarium at Durban, and in the herbaria of Capetown and Strassbourg, the second in his own and the Pretoria herbaria, the third in his own herbarium, and the last in the herbarium of the University of Basutoland.

The Nevling & Gómez-Pompa 277, distributed as a Verbena, is actually Lantana camara var. mutabilis (Hook.) L. H. Bailey; T. Morley 627 is Lantana macropoda Torr.; Belshaw 3161 is Lantana trifolia L.; Johnson & Johnson 1828 and Stuessy 1031 are Priva grandiflora (Ort.) Moldenke; and Martin, Hevly, & Arms 314 and Popenoe s.n. [Lucile Drive] are mints.

An additional excluded species is:

Verbena baldwini Fitch, Univ. Kans. Nat. Hist. Reserv. 49, nom. nud. = Vernonia baldwini Torr., Carduaceae

VERBENA ABRAMSI Moldenke

Additional & emended synonymy: Verbena lasiostachys abramsii Ferris in Abrams & Ferris, Illustr. Fl. Pacific States, pr. 1, 4: 730. 1960.

Additional bibliography: Abrams, Illustr. Fl. Pacific States, pr. 1, 3: 611. 1951; Ferris in Abrams & Ferris, Illustr. Fl. Pacific States, pr. 1, 4: 730 (1960) and pr. 2, 4: 730. 1965; Hocking, Excerpt. Bot. A.11: 102, 103, & 503. 1967; Abrams, Illustr. Fl. Pacific States, pr. 2, 3: 611. 1967; Munz & Keck, Calif. Fl. 688 & 1679. 1968; Hocking, Pharmaceut. Abstr. 9 (2): entry 656 (1968) and 9 (3): entry 1068. 1968; Moldenke, Biol. Abstr. 49: 3252 & 5713. 1968; Hocking, Excerpt. Bot. A.13: 570 & 571. 1968; Moldenke, Résumé Suppl. 17: [1]. 1968; Moldenke, Phytologia 16: 183. 1968; Moldenke, Fifth Summ. 1: 65 (1971) and 2: 649, 679, & 912. 1971.

This plant has been found growing on sand-bars.

Peter Rubtsoff, in April, 1971, examined Newlon 271 in the herbarium of the University of Wisconsin and reports that "This specimen.....is identical with Jepson 9486, collected at the same place on the same day (on the same trip, acc. Jepson's notebook) and annotated and cited by Moldenke as V. lasiostachys var. septentrionalis (Phytologia 9: 472. 1964). Newlon 271, though, has been cited by Moldenke as V. Abramsi (Phytol. 8: 177. 1962). The calyx and its teeth are too long, though, to fit Moldenke's description of V. Abramsi. V. lasiostachys var. septentrionalis seems to be a better name for it, although the upper surface of leaves, in both it and Jepson 9486, tends to be scabridous, ap-

proaching in this character V. lasiostachys var. scabrida."

Additional citations: CALIFORNIA: Alameda Co.: Purer 5438 (Sd—38890). Los Angeles Co.: F. McCulloch 2063c (Sd—38894).

xVERBENA ADULTERINA Hausskn.

Additional bibliography: Moldenke, Résumé Suppl. 16: 28. 1968; Moldenke, Phytologia 15: 484. 1968; Moldenke, Fifth Summ. 1: 206 (1971) and 2: 686, 699, 710, & 912. 1971.

VERBENA ALATA Sweet

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 570. 1965; Hocking, Excerpt. Bot. A.12: 424. 1967; Moldenke, Phytologia 15: 484. 1968; Moldenke, Fifth Summ. 1: 177, 189, & 369 (1971) and 2: 649 & 912. 1971.

VERBENA ALATA f. ALBA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 181. 1966; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 912. 1971.

VERBENA AMBROSIFOLIA Rydb.

Additional synonymy: Verbena ambrosifolia Rydb. ex Small, in herb.

Additional & emended bibliography: Rydb., Fl. Rocky Mtns., ed. 1, 740 (1917) and ed. 2, pr. 1, 739 & 740. 1922; Parks, Tex. Agr. Exp. Sta. Bull. 155: 112. 1937; Wyman & Harris, Navajo Ind. Ethnobot. [Univ. N. M. Bull. 366 (Anthrop. Ser. 3, 5):] 18, 23, & 44. 1941; Hocking, Excerpt. Bot. A.1: 430. 1959; Winter, Winter, & Van Bruggen, Check List Vasc. Pl. S. D. 124. 1959; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 725 & 727. 1960; W. A. Weber, Rocky Mtn. Fl. 305. 1967; Moldenke, Résumé Suppl. 16: 2 (1968) and 17: [1]. 1968; Burlage, Ind. Pl. Tex. 183, 184, 206, 228, 236, & 243. 1968; Moldenke, Phytologia 15: 484--486 (1968) and 16: 183--184 & 215. 1968; Rydb., Fl. Rocky Mtns., ed. 2, pr. 2, 739 & 740. 1969; R. A. Nels., Handb. Rocky Mtn. Pl. 239. 1969; Rickett, Wild Fls. U. S. 3 (2): 362 & 364 (1969) and 4 (3): 539 & 799. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1324--1327. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Thilenius, U. S. Dept. Agr. Forest Serv. Res. Pap. RM.71: 42. 1971; Moldenke, Fifth Summ. 1: 42, 43, 47, 51, 52, 57, 61, 63, 74, & 369 (1971) and 2: 649--651, 654, 912, & 973. 1971.

Weber (1967) describes this species as "Flowers showy, pink; corolla-tube much exceeding the calyx; leaves very deeply pinnatifid.....Wild Verbena. A handsome species, similar to some of the cultivated verbenas. Plains and mesas." Nelson (1969) says of it "occasionally found on the high plains and lower foothills along the eastern and southern fringes of the Rockies. It is a branching plant with decumbent stems, deeply pinnatifid leaves and clusters of showy rose-purple flowers." Rickett (1969) says that it "has spreading stems which may be hairy. The short-

stalked leaves are twice pinnately cleft, bearing hairs which lie flat. The bracts are shorter than the calyx. The flowers are lavender or purplish, with a corolla-tube a little longer than the calyx, and sometimes only 1/4 inch across. April to December; in fields and deserts and on prairies through much of Texas and westward to Arizona, Colorado, and northern Mexico."

Parks (1937) avers that this is the "Western form of Common Verbena [V. bipinnatifida Nutt.] of the whole of Texas. It is found as abundantly in sections 7, 5, and 6 as Verbena bipinnatifida is found in the remainder of the state. The leaves are longer than wide. The flowers are of a deeper shade of color than the eastern relative. This species should be introduced in the central parts of the state as there is no doubt that it will maintain itself through long periods of time. It is in cultivation in many places. To obtain this plant, the seed pods should be gathered as soon as ripe, and seed planted only where it is to be grown."

The Winters & Van Bruggen (1959) state that V. ambrosifolia is found only in the dry rocky places of the western part of South Dakota and note that "The range listed by Harrington is south of S. Dak. Listed for S. Dak. by Rydb." Howell & McClintock (1960) record it from many counties in Texas.

Recent collectors have found this plant growing in gravelly or moist sandy soil, limestone soil, sandy dry soil "but slightly more moist than the surrounding area", in moist sand of drainage slopes, moist soil adjacent to the Carrizozo lava flow, hard sandy marl silt, rocky limestone loam, and shallow soils with rock or gravel, in vacant lots and desert pavement, in wash-beds and sandy fields, on banks, among large rocks, on open silty deserts, the Chihuahuan desert, alkali flats, and gypsum land, in pinyon pine - juniper associations, on open slopes, under live oaks in grassy valleys, and along roadsides, dry or sandy roadsides, roadsides bordering lava flows, and wide sandy creeks. The Mearses describe it as common with Peganum, Linum, Aristida, Bahia, and Lesquerella in Texas, where Rowell describes it as "occasional" in tight sandy loam. Youngblood says that it is frequent in rocky sand and Waller calls it occasional in the sandy loam of prairies. In the same state Muller found it to be only "sparse" on limestone, Hawkins found it "in limestone-derived loam of playa lake bed in area of mesquite to creosotebush", while Collins found it "in deep sand dominated by mesquite and grasses". Dunn collected specimens where "everything was badly eaten back by a large flock of angora goats". In New Mexico it grows in the Upper Sonoran Zone, according to Bennett, while the Twens describe it as "very abundant on open rangeland" and "common on range and on lava flows" in Lincoln County. Norland reports it "occasional" in Arizona.

Collectors describe the plant as an erect or decumbent perennial or as an herb from a perennial woody root, but Pruett calls it a "low annual found in sandy soil". The corollas are described as "bluish" on Hawkins 7, "rose" on Muller 8215, "lavender" on

Youngblood 21, "violet" on Devor 262, "dark-blue" on Pruett s.n., "purple" on McCracken 25 and Mitchell 58 & 129, and "deep-purple" on Rowell 5734.

The chromosome count of $n = 15$ was secured from Solbrig 3175 & 3213 by Solbrig.

Additional vernacular names recorded for V. ambrosifolia are "ragweed", "ragweed verbena", and "wild verbena". Burlage (1968) records that in Texas a bath of the leaves is prepared for the treatment of rheumatism and the dry leaves are rubbed on parts of the human body affected by skin diseases.

Material of this species has been distributed in some herbaria under the additional names of Verbena bipinnatifida var. bipinnatifida Devor, V. elegans var. asperata Perry, and V. imbricata Woot. & Standl. On the other hand, the O. B. Metcalfe 1231, distributed as V. ambrosifolia and so cited by Perry, is actually V. ambrosifolia f. eglandulosa Perry in at least some herbaria, while G. Nelson 30, Rosson 490b, Rowell 8770 & 10256, B. Smith 33, Stuessy 1014, and Zinn 38 are V. bipinnatifida Nutt., Stuessy 959 is V. ciliata Benth., Beaman 2667 & 4460 are V. teucrifolia Mart. & Gal., and Cory 52259 and Tharp & Janszen 49-1141 are V. wrightii A. Gray.

Additional citations: COLORADO: Denver Co.: J. M. Coulter s.n. [May 17, 1873] (Se—234376). Jefferson Co.: J. H. Ehlers 8367 (Mi). OKLAHOMA: Comanche Co.: E. J. Palmer 11750 (N). Pontotoc Co.: G. T. Robbins 2335 (N). TEXAS: Brewster Co.: T. D. Devor 262 (Lk); M. D. McCracken 25 (Lk); B. Pittman 39 (Lk); D. Youngblood 21 (Lk). Crosby Co.: L. Mitchell 129 (Lk). Culberson Co.: Mears & Mears 1563 (Au—258420); Scholl 11, in part (Ip); Solbrig 3213 (W—2607467); Tharp & Janszen 49-1169 (N). Dallam Co.: Rowell 5734 (Au—187050). Deaf Smith Co.: Waller 844 (Lk), 980 (Lk). Ector Co.: T. Collins 100 (Lk), 178 (Lk); D. Hawkins 7 (Lk). Hudspeth Co.: C. H. Muller 8215 (Mi). Jeff Davis Co.: L. Mitchell 58 (Lk). La Salle Co.: Cory 28550 (Se—113349). Loving Co.: Stuessy 184 (Au—246284, Ip). Lubbock Co.: J. Pruett s.n. [4-7-64] (Lk). Pecos Co.: C. M. Rowell 11148 (Lk). Presidio Co.: J. Reed 28 (Lk). NEW MEXICO: Chaves Co.: J. S. Martin 933 (Se—108452). De Baca Co.: Secor 62 (Au—257269). Eddy Co.: G. J. Ikenberry 90 (Lk); Rosson 1340 (Lk), 1382 (Lk, Lk). Lincoln Co.: F. A. Iwen 187 (Ws); Iwen & Iwen 13 (Ws), 33 (Ws), 294 (Ws), 330 (Ws), 335 (Ws), 383 (Rf, Ws), 398 (Ws), s.n. [T.10S; R.8E; Sec. 21] (Ws), s.n. [T63S; R.10E; Sec. 27] (Ws); Solbrig 3175 (W—2607468). Otero Co.: W. Hess 299 (Se—226438). Santa Fe Co.: H. R. Bennett 8239 (Go). Socorro Co.: D. B. Dunn 3050 (N). ARIZONA: Cochise Co.: Norland s.n. [21 Aug. 1959] (Sd—67426). MEXICO: Coahuila: Johnston & Muller 186 (Mi), 580 (Mi), 1125 (Mi); Mendiola s.n. [Saltillo Torreón] (Ip). Nuevo León: Dominguez & McCart 8263

(Au--222200); Reséndez 79 (Au--222191).

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry

Additional synonymy: Verbena ambrosifolia eglandulosa Perry ex Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970.

Additional bibliography: Hocking, Excerpt. Bot. A.1: 430. 1959; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 727. 1960; Moldenke, Phytologia 16: 183--184. 1968; Moldenke, Résumé Suppl. 16: 2. 1968; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1325. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Moldenke, Fifth Summ. 1: 50, 52, 57, 61, 63, & 74 (1971) and 2: 649, 650, 658, & 912. 1971.

This plant has been found growing in orchards, flowering (in addition to the months previously reported) in January and fruiting in January, May, and June. The corollas are described as "pink" on Hinton 17130 and as "periwinkle-blue" on Matthews & Matthews 394. The Matthews describe the plant as "occasional on open hillsides" and report that the flowers are very fragrant. The Mearses report it as "common with Berberis, Penstemon, and Asclepias" in Arizona. The O. B. Metcalfe 1231 collection, cited below, is cited by Perry as typical V. ambrosifolia, but I fail to see on it the characteristic glands.

The R. Runyon 2361, distributed as V. ambrosifolia f. eglandulosa, is actually V. ciliata var. longidentata Perry.

Additional citations: NEW MEXICO: Grant Co.: O. B. Metcalfe 1231 (N). ARIZONA: Coconino Co.: Matthews & Matthews 394 (Au--259895). Greenlee Co.: A. F. Brown 126 (Rf). Yavapai Co.: Demaree 41126 (Au--239069); Mears & Mears 1815 (Au--257888). MEXICO: Guanajuato: J. Rzedowski 9542 (Mi). Nuevo León: Hinton & al. 17130 (Mi).

VERBENA AMOENA Paxt.

Additional bibliography: Moldenke, Phytologia 13: 244. 1966; Moldenke, Fifth Summ. 1: 74 & 399 (1971) and 2: 672 & 912. 1971.

Latorre found this plant growing in volcanic soil at 4700 feet altitude, flowering and fruiting in May, and describes the corolla as "purple".

Additional citations: MEXICO: Coahuila: Latorre s.n. [12 May 1968] (Au--265072).

VERBENA ANDALGALENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 10: 92. 1964; Moldenke, Fifth Summ. 1: 200 (1971) and 2: 912. 1971.

Thus far, this plant has been collected in flower and fruit only in March.

Additional citations: ARGENTINA: Catamarca: O'Donell & Meyer 5204 (N).

VERBENA ANDRIEUXII Schau.

Additional bibliography: Moldenke, Phytologia 13: 244. 1966; Moldenke, Fifth Summ. 1: 74, 205, & 369 (1971) and 2: 651 & 912. 1971.

Harper found this plant growing in light brown loam probably derived from volcanic breccia in pinyon-oak-juniper woodland with good drainage, fruiting in June.

Additional citations: MEXICO: Durango: C. C. Harper 37 (Mi).

VERBENA ARAUCANA R. A. Phil.

Additional synonymy: Glandularia araucana Phil. ex Moldenke, Fifth Summ. 520, in syn. 1971.

Additional bibliography: Moldenke, Phytologia 15: 485. 1968; Moldenke, Fifth Summ. 1: 192 (1971) and 2: 520, 653, & 912. 1971.

The Kreibohm 117, distributed as V. araucana, is actually V. aurantiaca Speg.

VERBENA ARENARIA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 182. 1966; G. Taylor, Ind. Kew. Suppl. 14: 142. 1970; Moldenke, Fifth Summ. 1: 200 (1971) and 2: 912. 1971.

xVERBENA ARGENTINA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 182. 1966; G. Taylor, Ind. Kew. Suppl. 14: 142. 1970; Moldenke, Fifth Summ. 1: 200 (1971) and 2: 912. 1971.

VERBENA ARISTIGERA S. Moore

Additional synonymy: Verbena aristigira S. Moore ex J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 629, sphalm. 1960. Glandularia aristigira (S. Moore) Troncoso, Darwiniana 14: 636. 1968.

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 629. 1960; Troncoso, Darwiniana 14: 636 & 638. 1968; J. A. Clark, Card Ind. Gen. Sp. Var. issue 257. 1968; Moldenke, Phytologia 15: 485. 1968; N. F. Good, Biol. Abstr. 50: 9661. 1969; Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 205. 1970; Moldenke, Fifth Summ. 1: 177, 184, 187, 189, 200, & 369 (1971) and 2: 520, 912, & 973. 1971.

Troncoso (1968) reduces V. tenuisecta Briq. to synonymy here, noting that "El estudio del tipo de Verbena aristigira Sp. Moore, que se conserva en el 'British Museum (Nat. History)', ha permitido establecer su identidad con Glandularia tenuisecta del Paraguay. El carácter 'antherarum omnium connectivo apice inappendiculato', dado por Spencer Moore para su especie, es erróneo. Las anteras del ejemplar tipo poseen apéndices glandulares, pero éstos son muy reducidos y no sobrepasan las tecas, de ahí que probablemente hayan pasado desapercibidos al autor." She cites S. Moore 1083 from Mato Grosso, Brazil, Jørgensen 2470 and Pierotti 10 from Formosa, Argentina, and Bazzi 230 from Chaco, Argentina. However, I still think that the two taxa are sufficiently

distinct to deserve separate designation. The details of leaf characters are sufficient to distinguish them. The Woolston 254, cited below, was previously erroneously reported by me as V. tenuisecta. The collector describes it as a semi-procumbent herb, 10--35 cm. tall, growing on low campos.

In addition to the months previously recorded by me for this species being found in bloom, it has been collected in anthesis in June. In fruit it has been collected in April, June, July, and September to December. Schnack & Rubens (1970) record it from Corrientes and Misiones, Argentina.

The Steinbach 321, also cited below, is not typical in its leaf characters and may actually represent some other taxon; its corollas are described as "violet" and the "caliz verde con jaspe purpurino", as it is in typical V. aristigera.

Additional citations: BOLIVIA: Santa Cruz: R. F. Steinbach 321 (N). PARAGUAY: Woolston 254 (N, S). ARGENTINA: Formosa: I. Morel 1601 (N), 1900 (N), 2438 (N), 2473 (N), 2637 (N), 3137 (N), 3262 (N), 3390 (N), 3420 (N), 3428 (N), 3467 (N), 3603 (N), 3633 (N), 3724 (N), 3823 (N), 3906 (N), 4106 (N), 4142 (N), 6351 (N), 6445 (N); A. Reales 10 (N), 48 (N); G. J. Schwarz 2911 (N). Misiones: Buratovich 84 (N, N); G. J. Schwarz 4865 (N).

VERBENA ATACAMENSIS Reiche

Additional bibliography: Moldenke, *Phytologia* 13: 244. 1966; Moldenke, *Résumé Suppl.* 16: 6. 1968; Moldenke, *Fifth Summ.* 1: 192 & 200 (1971) and 2: 697 & 912. 1971.

The corollas are described as having been "cream"-colored on Semper 672. This collector found the plant growing at 3000 m. altitude, flowering in May.

Additional citations: ARGENTINA: Mendoza: Semper 672 (N).

VERBENA AURANTIACA Speg.

Additional bibliography: Autran, *Trab. Mus. Farmac. Fac. Cienc. Méd. Buenos Aires* 13: 33. 1907; Ruiz Leal & Roig, *Bol. Soc. Argent. Bot.* 7: 119. 1958; Cabrera, *Bol. Soc. Argent. Bot.* 7: 150, 151, & 290. 1958; Moldenke, *Phytologia* 10: 93. 1964; Moldenke, *Fifth Summ.* 1: 192 & 200 (1971) and 2: 912. 1971.

The plant has been collected in fruit in January. Material has been distributed in some herbaria under the name Glandularia araucana Phil.

Additional citations: ARGENTINA: Chubut: Kreibohm 117 (W--2568451). Neuquen: O'Donnell 2186 (N).

VERBENA AURANTIACA var. GLABERRIMA Moldenke

Additional bibliography: Ruiz Leal & Roig, *Bol. Soc. Argent. Bot.* 7: 119. 1958; Cabrera, *Bol. Soc. Argent. Bot.* 7: 150 & 290. 1958; Moldenke, *Phytologia* 8: 193. 1962; Moldenke, *Fifth Summ.* 1: 200 (1971) and 2: 912. 1971.

Ruiz Leal & Roig (1958) report this plant as one of many para-

sitized by Cuscuta microstyla Engelm., citing their no. 15634. They state that the stems, inflorescences, buds, and leaves of the host plant are involved in the attacks.

VERBENA AURANTIACA f. ROSEA Moldenke

Additional bibliography: Cabrera, Bol. Soc. Argent. Bot. 7: 151 & 290. 1958; Moldenke, Phytologia 8: 193. 1962; Moldenke, Fifth Summ. 1: 200 (1971) and 2: 912. 1971.

VERBENA AUSTRALIS Moldenke

Additional bibliography: Moldenke, Phytologia 8: 380 (1962) and 8: 461. 1963; Angely, Fl. Anal. Paran., ed. 1, 570. 1965; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 912. 1971.

xVERBENA BAILEYANA Moldenke

Additional & emended bibliography: H. F. Roberts, Fl. Hybrid. Before Mendel 24 & 28. 1929; Moldenke, Phytologia 11: 438. 1965; Moldenke, Fifth Summ. 1: 369 (1971) and 2: 672, 673, 686, 697, 700, & 912. 1971.

VERBENA BAJACALIFORNICA Moldenke

Additional bibliography: Moldenke, Phytologia 11: 438. 1965; Moldenke, Fifth Summ. 1: 74 (1971) and 2: 912. 1971.

VERBENA BALANSAE Briq.

Emended synonymy: Verbena thymoides Chod. apud Briq. in Chod. & Hassler, Bull. Herb. Boiss., ser. 2, 4: 1059, in syn. 1904 [not V. thymoides Cham., 1832, nor Cham. & Schlecht., 1963, nor L., 1863, nor Phil., 1891].

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 570. 1965; Moldenke, Phytologia 15: 485. 1968; Moldenke, Fifth Summ. 1: 177, 187, & 200 (1971) and 2: 702 & 912. 1971.

Woolston describes this plant as decumbent or prostrate, the corollas pale-blue, the tube dark-violet. Hatschbach states that it grows from a definite xylopodium and that the corollas are "lilac" in color.

Additional citations: BRAZIL: Paraná: Hatschbach 15345 (W-- 2564729); Hatschbach, Smith, & Klein 12142 (Ac). PARAGUAY: T. Rojas s.n. [Hassler 10682a] (Ws); Woolston 722 (N).

VERBENA BALLSII Moldenke

Additional bibliography: Moldenke, Phytologia 8: 199--200 & 401. 1962; Moldenke, Fifth Summ. 1: 200 (1971) and 2: 912. 1971.

VERBENA BANGIANA Moldenke

Additional bibliography: Moldenke, Résumé Suppl. 17: 12. 1968; Moldenke, Phytologia 16: 184. 1968; Moldenke, Fifth Summ. 1: 184 (1971) and 2: 912. 1971.

Additional citations: BOLIVIA: Cochabamba: Dereims s.n. [Morochoto, 18.XI.1903] (P).

VERBENA BARBATA Grah.

Additional bibliography: Moldenke, *Phytologia* 11: 438. 1965; Moldenke, *Fifth Summ.* 1: 74 (1971) and 2: 653 & 912. 1971.

xVERBENA BEALEI Moldenke

Additional bibliography: J. F. Macbr., *Field Mus. Publ. Bot.* 13 (5): 613. 1960; Moldenke, *Phytologia* 10: 93. 1964; Moldenke, *Fifth Summ.* 1: 369 (1971) and 2: 674, 680, & 912. 1971.

VERBENA BERTERII (Meisn.) Schau.

Additional & emended bibliography: Maund, *Bot. Gard.* 5: pl. 106 ["422"]. 1834-1835; Jacks. in Hook. f. & Jacks., *Ind. Kew.*, pr. 1, 2: 895 & 1178 (1895), pr. 2, 2: 895 & 1178 (1946), and pr. 3, 2: 895 & 1178. 1960; J. F. Macbr., *Field Mus. Publ. Bot.* 13 (5): 614, 616, & 625. 1960; Moldenke, *Phytologia* 15: 486. 1968; Moldenke, *Fifth Summ.* 1: 143, 184, 192, 200, & 369 (1971) and 2: 521, 619, 621, 653, 666, 667, & 912. 1971.

Emended illustrations: Maund, *Bot. Gard.* 5: pl. 106 ["422"] (in color) [as *V. radicans*]. 1834-1835.

Macbride (1960) notes that *V. berterii* "Differs from the Brazilian *V. tenera* Spreng. and the Chilean *Glandularia sulfurea* (D. Don) Schnack & Covas in the pubescent corolla, also from the former in leaves, from the latter in sessile appendages. Annual or perennial herb, corolla red-purple, limb bluish-lavender." He cites only Metcalf 30267 & 30322 from Peru.

The corollas on Kausel 3943 are described as having been "bluish", while those on Biese 44 were "white, somewhat blue". The plant has been collected in fruit in November.

The Edwin & Schunke 3692, distributed as *V. berterii*, is actually *V. occulta* Moldenke, while Zöllner 4399 is *V. sulphurea* D. Don.

Additional citations: CHILE: Bío-Bío: Pfister 2177 (Ca-1286486). Santiago: Biese 44 (N). Valparaíso: Kausel 3943 (N).

VERBENA BERTERII f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 10: 94. 1964; Moldenke, *Fifth Summ.* 1: 143 & 192 (1971) and 2: 653 & 912. 1971.

It is possible that the Biese 44 specimen, cited above as typical *V. berterii*, is better placed in this form because the collector describes its flowers as "white, somewhat blue". It is not clear if the "somewhat blue" is the normal color of the corolla in anthesis or is just a stage in the withering of the white-flowered form.

xVERBENA BINGENENSIS Moldenke

Additional bibliography: Hitchc., Cronquist, & Ownbey, *Vasc. Pl. Pacif. Northwest* 4: 244--245. 1959; Moldenke, *Phytologia* 10: 94. 1964; Moldenke, *Fifth Summ.* 1: 64 (1971) and 2: 656, 679, & 912. 1971.

Hitchcock, Cronquist, & Ownbey (1959) say of this plant: "mis-

takenly considered by Moldenke to be a hybrid of V. bracteata and V. lasiostachys Link. [sic!]; the latter species is not known to occur n. of approximately the Willamette-Umpqua divide, 150 miles s.w. of Bingen, Wash." This situation, of course, was fully discussed by me in Am. Midl. Nat. 59: 342--343 (1958). As Muehlenbach has pointed out, species often appear out of their normal range along railroad tracks and elsewhere, persist for a year or two, and then disappear. This could easily have happened in this case and the two putative parents could have been growing at Bingen long enough to produce the hybrid.

The author of the name, Verbena lasiostachys, was Johann Heinrich Friedrich Link (1767--1851), so the authority after the binomial is not an abbreviation.

Additional citations: WASHINGTON: Klickitat Co.: Suksdorf s.n. [Bingen, July 9, 1898] (Se--118380--isotype).

VERBENA BIPINNATIFIDA Nutt.

Additional & emended synonymy: Verbena bipinnatifida L. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962. Verbena biplinatifida Nutt. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962. Verbena bipinnatifida Nutt. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena bipinnatifida Nutt. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena bipinnatifida Torr. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena bipinnatifida Reimsch. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena bipinnatifida Nutt. ex Moldenke, Fifth Summ. 2: 654, in syn. 1971. Verbena bipinnatifida Engelm. & Gray ex Moldenke, Fifth Summ. 2: 654, in syn. 1971. Verbena bipinnatifida var. bipinnatifida Devor, in herb. Verbena beipinnatifida Nutt., in herb. Verbena bininnafillia Abrigo, in herb.

Additional & emended bibliography: S. Wats. & Coult. in A. Gray, Man. Bot., ed. 6, pr. 1, 402 (1889) and ed. 6, pr. 2, 402. 1890; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 1, 1: 1032 (1893) and pr. 1, 2: 1178. 1895; Robinson & Fern. in A. Gray, Man. Bot., ed. 7, 689 & 924. 1908; Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 94 & 97, fig. 3559. 1913; Rydb., Fl. Rocky Mtns., ed. 1, 739 & 740 (1917) and ed. 2, pr. 1, 739 & 740. 1922; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 94 & 97, fig. 3559. 1936; Parks, Tex. Agr. Exp. Sta. Bull. 155: 112. 1937; Britton & Br., Illustr. Fl., ed. 2, pr. 3, 3: 94 & 97, fig. 3559. 1943; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 2, 1: 1032 (1946) and pr. 2, 2: 1178. 1946; Britton & Br., Illustr. Fl., ed. 2, pr. 4, 3: 94 & 97, fig. 3559. 1947; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 612. 1951; Rydb., Fl. Rocky Mtns., ed. 2, pr. 2, 739 & 740. 1954; Winter, Winter, & Van Bruggen, Check List Vasc. Pl. S. D. 124. 1959; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 725 & 727. 1960; Jacks. in Hook. f. & Jacks., Ind. Kew., pr. 3, 1: 1032 (1960) and pr. 3, 2: 1178. 1960; R. R. Stewart,

Pakist. Journ. Forest. 11: 59. 1961; Poindexter, Trans. Kans. Acad. Sci. 65: [409] & 419. 1962; Hocking, Excerpt. Bot. A.6: 91 & 534. 1963; Maheshwari, Fl. Delhi 278—279. 1963; Srinivasan & Agarwal, Bull. Bot. Surv. India 5: 80. 1963; Thornberry, U. S. Dept. Agr. Agric. Handb. 165: 479. 1966; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 612. 1967; Shinn, Univ. Kans. Sci. Bull. 46: 881. 1967; Hocking, Excerpt. Bot. A.13: 571. 1968; Moldenke, Biol. Abstr. 49: 4697. 1968; Moldenke, Résumé Suppl. 16: 28. 1968; Moldenke, Phytologia 16: 184, 209, & 215. 1968; Munz & Keck, Calif. Fl. 688 & 1679. 1968; Munz, Suppl. Calif. Fl. 101. 1968; A. & I. Nehrling, East. Gard. Drought-resist. Pl. 230 & 254. 1968; Pullen, Jones, & Wats., Castanea 33: 332. 1968; Whittaker & Niering, Journ. Ecol. [Brit.] 56: 528. 1968; A. L. Moldenke, Phytologia 18: 127. 1969; M. A. Rau, Bull. Bot. Surv. India 10, Suppl. 2: 63. 1969; Rickett, Wild Fls. U. S. 3 (2): 362 & [363], pl. 110. 1969; Rydb., Fl. Rocky Mtns., ed. 2, pr. 3, 739 & 740. 1969; Swink, Pl. Chicago Reg. 427. 1969; El-Gazzar & Wats., New Phytol. 69: 458, 483, & 485, fig. 1. 1970; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 94 & 97, fig. 3559. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317, 1324, & 1325. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Rickett, Wild Fls. U. S. 4 (3): 539, [541], & 799, pl. 176. 1970; G. W. Park Seed Co., Park's Flower Book 1971: 75. 1971; I. Sm., Ariz. Highw. 47 (8): 4. 1971; Thilenius, U. S. Dept. Agr. Forest Serv. Res. Pap. RM.71: 42. 1971; Moldenke, Fifth Summ. 1: 27, 32, 33, 41, 43, 45, 47, 49, 51, 52, 57, 61, 63, 74, & 369 (1971) and 2: 521, 652—654, 658, 665, 671, 690, 708, & 912. 1971.

Additional & emended illustrations: Britton & Br., Illustr. Fl., ed. 1, 3: 72, fig. 3064. 1898; Robinson & Fern. in A. Gray, Man. Bot., ed. 7, 689, fig. 880. 1908; Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 97, fig. 3559 (1913), ed. 2, pr. 2, 3: 97, fig. 3559 (1936), ed. 2, pr. 3, 97, fig. 3559 (1943), and ed. 2, pr. 4, 3: 97, fig. 3559. 1947; Rickett, Wild Fls. U. S. 3 (2): [363], pl. 110 (in color) (1969) and 4 (3): [541], pl. 176 (in color). 1970; El-Gazzar & Wats., New Phytol. 69: 458, fig. 1. 1970; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 97, fig. 3559. 1970.

Recent collectors describe this plant as follows: small herbs standing about 8—10 cm. tall or spreading over the ground, annuals or creeping perennials, prostrate with a spread of 9 dm. or more or semi-trailing 1—2 feet, the stems running and rooting, branched at the base, about 2 dm. long, the flowers with a faint odor, the stamens bright-yellow.

The color of the corolla is described as "pink" on Whitten 13, "lavender" on Correll 16247, Lundell & Lundell 12132, Meek 30, and Watts s.n., "light-violet" on Gould 9080, "violet" on Galloway 36 and Gipson 76, "light-lavender" on Griffin 93, "dark purple-blue" on Legg s.n., "bluish-purple" on Wilfong 27, "blue-purple" on McCracken 97 and Stewart 43, "bright blue-purple fading to blue" on Foreman 7, "medium blue-purple" on Meek 2, "showy

blue-violet" on Weaver 8, "bluish" on Hawkins 37, "dark-blue" on Owen s.n. and Pilcher 50, "blue" on Pilcher 80 & 188, Thompson 18, Weddle 68, and Whitley 4, "pale-purple" on Rowell 8037, and "purple" on Fowler 11, Leonard 14, Leverich 18, Mears 656, Mitchell 27, Patterson s.n., Runyon 4340, Rzedowsky 21919, Stuessy 1014, and Youngblood 75.

An additional common name recorded for the species is "wild sweet William".

Recent collectors have found the plant growing in open coniferous woods, open oak-mesquite woodlands, pastures, open fields, sandy upland prairie pastures with sparse grass cover, and mesquite grasslands, in post oak savannas and desert scrub on level plateaus, in red gypsum soil, hard sandy marl silt, loose black or rocky soil, rich alluvial marl, clay- or sandy-loam, tight shallow dry or limestone loam, red sandy loam, calcareous or black calcareous clay, dry alkaline soil, rocky sandy soil, fine sandy loam of root-plowed pastures, and somewhat shaded sand-clay soil, on limestone outcrops, caprock country hillsides, and caprock ledges in limestone gravel, in sandy loam and gravel, limestone and gypsum gravels, and disturbed black rocky soil, at the base of barrancas, along roadsides, in disturbed roadside areas, pastures near creeks, and sandy-clay of river-bottoms, and on chalk barrens, flowering and fruiting in January (in addition to the months previously reported).

Correll found the plants of this species "scattered infrequently", while Weaver found them "fairly frequent in red clay soil mixed with beds of legumes" and Pilcher "among mustards, mesquite, and fescue-grass". In Kansas Horr & McGregor report it "common in dry sand of roadside ditches" and Richardson & Robertson "common on grazed prairies". In Texas Mears says it is "not common in sun" in Caldwell County, Youngblood reports it an "herb frequent in black loam roadsides" in Mills County, while in Bexar County Hawkins found it "in dark gray-black not rocky sandy loam in mesquite pastureland with sparsely scattered brush grazed by cattle", in Hemphill County Meek found it in "clay soil on limestone outcrops" and in Taylor County the same collector reports it as "very common perennial herb with trailing stems in calcareous soils". Gipson found it "in red sandy loam of cleared pasturelands" in Mason County and Horn avers that it is "common in sandy disturbed roadsides" in Kent County. Cory found it "occasional in ungrazed parks" in Kerr, but "frequent on roadsides" in Tom Green County. In Dickens County it was encountered by Rowell on "sandstone ledges and sandy loam in oak shineries", in Kendall County Waller reports it "occasional in calcareous clay loam", and in Deaf Smith County the same collector found it only "occasional on sandy loam roadsides".

In Garza County, Texas, Rowell says it is "locally frequent in red sandy loam", McCampbell reports it "occasional in pastures", Weddle says "frequent in sandy loam near park benches of roadside parks", and McCracken describes it as an "abundant perennial with spreading trailing stems in tight clay-like soil".

In Lubbock County Leonard calls it an "annual herb occasional in sandy loam", Watts avers that it is "found only in spots, actually infrequent and an annual", and Higginbotham found it "in lawns composed of grass and hard sand with a few mustard plants". Griffin calls it "locally common in limey roadsides" of Tarrant County, while Stewart refers to it as a "perennial with trailing stems common on limestone slopes and sandy soil" in Randall County.

Solbrig (1962) reports the haploid chromosome number as 15, based on Solbrig 3168, 3175, 3181, 3206, and 3212, from Santa Fe and Lincoln Counties, New Mexico, and Reeves, Brewster, and Culberson Counties, Texas. Lewis & Oliver (1961) give the diploid number as 30.

Srinivasan & Agarwal (1963) tell us that V. bipinnatifida is often cultivated in India, while Stewart (1961) maintains that it has escaped "at Abbottabad & Mansehra", in the Rawalpindi District of Pakistan. I am fairly sure, however, that in both these cases the plants being referred to are V. tenuisecta Briq., a species widely misidentified in India. The same comment applies to the record of Maheshwari (1963), who describes the plant in the Delhi area of India as "A prostrate, hirsute, perennial herb with ascending stems. Leaves divided into linear divisions, long-petiolate. Flowers lilac-purple, in dense heads elongating in fruits. Bracts equalling the sepals. Calyx lobes setaceous. Cultivated in garden beds and along slopes of private roads, forming a thick carpet and beautifying the landscape; often met as an escape in waste places near gardens. Flowers and Fruits: Winter season". He cites Maheshwari 241. All the herbarium material that I have seen thus far from India of this species complex has proved to be V. tenuisecta, a very commonly cultivated species.

Carpenter notes on the label of the collection cited below: "Typical. Flowers violet to blue, a variable species." Swink (1969) calls this species the "Dakota Verbena" and says "In our area known only from Lake County, Indiana, as cited by Deam, from a railroad embankment in the Columet District. This is based on a collection made along the Wabash Railroad near Clarke Junction (now part of Gary). Introduced from the West." Pullen, Jones, & Watson (1968) record it from Lee, Oktibbeha, and Sharkey Counties, Mississippi, while Whittaker & Niering (1968) found it growing to some extent on diorite in southeastern Arizona. Winter and his associates (1959) record it as growing on "plains and fields west of the Missouri River" in South Dakota.

Parks (1937) calls V. bipinnatifida "The native lavender verbenas of most of Texas. This is the earliest and most persistent of verbenas in the state. It blooms in early spring and under normal conditions will bloom through the summer. It can be transplanted from the wild in early spring or the seed secured and planted in mid-winter. This species is very widely used as a roadside planting in parks and is the foundation from which many horticultural varieties have been derived. Commercial." The Nehrlings (1968) recommend it as an annual drought-tolerant ground-cover plant. Parks' statement that this species enters largely into

the ancestry of horticultural varieties is news to me and seems a very questionable assertion. The cultivated verbenas are mostly derived from V. incisa Hook., V. peruviana (L.) Britton, and V. platensis Spreng., while the more recent cultivars with deeply dissected or bipinnatifid leaves have V. tenuisecta Briq. as one of the immediate ancestors. The only known hybrids involving V. bipinnatifida known to me are xV. oklahomensis Moldenke and xV. perplexa Moldenke, neither of which is known (to me) from cultivation at all.

The Cumbie 175 & 193, cited below, are vouchers for anatomical studies made on this species.

Shinn (1967) reports that the flowers of V. bipinnatifida are visited by the bee, Calliopsis verbenae. Thornberry (1966) notes that the species is sometimes grown for ornament and is attacked by the fungi Cercospora verbenicola Ell. & Ev. (a leaf-spot), Phymatotrichum omnivorum (Shear) Dug. (a root-rot), and Septoria verbenae Rob. (a leaf-spot) in Texas.

Material of V. bipinnatifida has been misidentified and distributed in some herbaria under the following names (in addition to those previously reported): V. ambrosaeifolia Rydb., V. elegans H.B.K., V. rigida Spreng., and Hydrophyllum capitatum Dougl.

On the other hand, H. R. Bennett 8239, T. Collins 100, Devor 262, D. Hawkins 7, W. Hess 299, G. J. Ikenberry 90, L. Mitchell 58, Porter & Porter 8978, Pruett s.n. [4-7-64], Rosson 1340 & 1382, C. M. Rowell 5734 & 11148, Stuessy 184, and Waller 844 & 980, distributed as V. bipinnatifida, are actually V. ambrosiifolia Rydb.; Matthews & Matthews 394 and O. B. Metcalfe 1231 are V. ambrosiifolia f. eglandulosa Perry; Keil, Pinkava, & Lehto 10150b and O. B. Metcalfe 177 are V. bipinnatifida var. latilobata Perry; Brick 14 and Stroud S.23 are V. canadensis (L.) Britton; Johnson & Johnson 1649 & 1712 are V. ciliata Benth.; Cory 51256, Cumbie 53, B. Hutchins 319, McCullough 6, Ripple 51-580, R. Runyon 1576, 1577, & 2495, and Strother 263 are V. ciliata var. longidentata Perry; B. Jensen 8 and Rosson 506c are V. ciliata var. pubera (Greene) Perry; Tucker 3478 is V. elegans var. asperata Perry; Mears & Mears 1691 is V. goodingii Briq.; T. Collins 91 (in part), Pilcher & Williams s.n. [Pilcher 117], G. T. Robbins 2449, and Swift s.n. [Fort Chadbourne, 1856] are V. pumila Rydb.; Sayid Akmad 113, Sultan-ul-Abedin 2643, and Surapat 41 are V. tenuisecta Briq.; and T. Collins 90 & 91 (in part) and Kruckeberg 4609 are V. wrightii A. Gray. Stuessy 1014 seems to be a mixture with V. ciliata.

Additional citations: ALABAMA: Dallas Co.: Small & Wherry 12586 (N). KANSAS: Barber Co.: S. Stephens 11158 (N). Kiowa Co.: Horr & McGregor 3809 (N). Logan Co.: R. L. McGregor 17251 (N); S. Stephens 11328 (N). Osborne Co.: Richardson & Robertson 782 (N).

Republic Co.: Morley 948 (N). Smith Co.: W. H. Horr. E.108 (N).
 Trego Co.: R. L. McGregor 17142 (W--2413340). COLORADO: Baca Co.:
W. A. Weber 4588 (Se--131577). OKLAHOMA: Choctaw Co.: Hopkins,
Nelson, & Nelson 328 (Se--103954); Nelson, Nelson, & Goodman 5534
 (Se--139669). Comanche Co.: Hopkins, Nelson, & Nelson 801 (Se--
 98549). Johnston Co.: Hopkins, Nelson, & Nelson 994 (Se--136587).
 Love Co.: Nelson, Nelson, Goodman, & Waterfall 5695 (Se--136615).
 Murray Co.: Hopkins, Nelson, & Nelson 667 (Se--98536), 709 (Se--
 103967); Mahler 1048 (Au--249063). TEXAS: Bailey Co.: Rosson 103
 (Lk). Bandera Co.: Ramirez & Cardenas 40 (Au--245206). Baylor
 Co.: D. W. Patterson s.n. [9 May 1966] (Lk). Bexar Co.: J. B.
Carpenter s.n. [San Antonio, May 1942] (Ws); D. Hawkins 37 (Lk);
Martz & Martz s.n. [June 3, 1959] (Ws); J. O. Perez 25 (Au--
 245169); R. Runyon 4340 (Au--268727, Au--269666). Borden Co.:
Mahler 794 (Au--248972). Bosque Co.: Pilcher 138 (Lk). Brazos
 Co.: H. B. Parks s.n. [4-20-47] (Au--121655). Brown Co.: R.
Clark 4 (Au--248401); M. A. Cole 121 (Lk); J. Johnson 5 (Au--
 248036); Maddalun 8 (Lk). Burnet Co.: Cumbie 175 (Lk); J. Jones
1 (Au--247678); F. Sylvester 2 (Au--217672). Caldwell Co.: Mears
584 (Au--249626). Callahan Co.: N. C. Henderson 63-126 (Au).
 Coleman Co.: Folkner 13 (Au--248095); Spoon 13 (Au--248060).
 Coryell Co.: Baize 13 (Au--244233); S. Jackson 11 (Au--248141).
 Cottle Co.: J. Parsons s.n. [July-August 1960] (Lk). Crosby Co.:
Galloway 36 (Lk); Zinn 38 (Lk). Dallas Co.: D. S. Correll 16247
 (Mi); Legg s.n. [4-6-64] (Lk); Lundell & Lundell 11315 (Se--
 155238), 12132 (N); J. Reverchon s.n. [Texas, May 1876] (W--
 2607193); Wilfong 27 (Mi). Deaf Smith Co.: Waller 1447 (Lk). De
 Witt Co.: Blanch 50 (Au--222198). Dickens Co.: B. S. Owen s.n.
 [April 19, 1964] (Lk); C. M. Rowell 10256 (Lk), 10266 (Lk); N. L.
Weaver 18 (Lk). Duval Co.: Llaguno 81 (Lk). Eastland Co.: Mah-
ler 1701 (Au--248826). Ector Co.: L. Mitchell 27 (Lk). Erath
 Co.: J. L. Fowler 11 (Lk). Gaines Co.: Hargrove & Tilton HT.
500677 (Lk). Garza Co.: D. Adams 81 (Lk); Berghane s.n. [April
 10, 1964] (Lk); Foreman 7 (Lk); J. L. Hillman 11 (Lk); McCamp-
bell F.4 (Lk); M. D. McCracken 97 (Lk); G. Nelson 30 (Lk); C. M.
Rowell 8037 (Lk); H. Thompson 18 (Lk); Weddle 68 (Lk). Hartley
 Co.: York & Rodgers 336 (Lk). Hays Co.: Abrigo s.n. [March 28,
 1963] (Au--219677); Bounds 174 (Au--230387); K. Peterson 114
 (Au--230472). Hemphill Co.: J. M. Meek 30 (Lk). Hill Co.: Pil-
cher 80 (Lk). Howard Co.: Whitley 4 (Lk). Hutchinson Co.: C.
Drake 22 (Au--239013). Kendall Co.: Waller 1735 (Lk). Kent
 Co.: R. F. Barr 9 (Lk); G. W. Horn s.n. [2 May 1964] (Lk). Kerr
 Co.: Cory 51759 (Mi, N). Lampasas Co.: Cumbie 193 (Lk). Llano
 Co.: Gentry & Barclay 18568 (Ld). Lubbock Co.: P. Brown 149

(Lk); R. Higginbotham 14 (Lk); V. B. Leonard 14 (Lk); Leverich 18 (Lk); E. L. Reed 3943 (Lk, Lk); B. Smith 33 (Lk); R. Watt s.n. [6 July 61] (Lk). Lynn Co.: Hargrove & Tilton HT.5006A1 (Lk). Mason Co.: Gipson 76 (Lk). McCullough Co.: Studhalter & Camp 1105 (Lk, Lk). Mills Co.: D. Youngblood 75 (Lk). Motley Co.: Whitten 13 (Lk). Nueces Co.: Bolen 81 (Lk). Parker Co.: McCart 8964 (Au--240365). Pecos Co.: C. M. Rowell 8770 (Lk). Randall Co.: B. Stewart 43 (Lk). Reagan Co.: Cory 53507 (Mi). Runnels Co.: Rosson 490b (Lk). San Patricio Co.: Gould & Hycka 8042 (Lk); S. Sanderson 13 (N). San Saba Co.: Calhoun 13 (Au--247941); E. Howell 1 (Au--248317). Scurry Co.: Pilcher 50 (Lk). Stephens Co.: Mahler 1645 (Au--248831). Tarrant Co.: D. Griffin 93 (Lk); Hobson s.n. [Ft. Worth, 5.15.88] (Mi). Taylor Co.: N. C. Henderson 61-940 (Go), 63-101 (Au--223074); J. M. Meek 2 (Lk). Throckmorton Co.: F. W. Gould 9080 (Lk). Tom Green Co.: Cory 50566 (Mi). Travis Co.: Collector undesignated s.n. [Austin, 4/12/35] (Lk); Ledingham 4636 (Sk); Tharp s.n. [Austin, 5/1/35] (Lk), s.n. [Austin, 5/9/35] (Lk); C. L. York 49004 (N). Uvalde Co.: Moore, Carasco, Gongora, & McCart 9028 (Au--233334). Williamson Co.: Mears 656 (Au--249660); J. Sargent 6 (Au--247942). ARIZONA: Cochise Co.: Baad 474 (Se--237421); L. Cook s.n. [June 18, '31] (Sd--4017); W. W. Jones s.n. [Sept. 30, 1956] (Sd--47819), s.n. [22 June 1962] (Sd--52476), s.n. [23 July 1962] (Sd--52477); Kruckeberg 3864 (Se--189891). Graham Co.: Baad 637 (Se--236431); Kruckeberg 4626 (N, Se--207496). NEW MEXICO: Santa Fe Co.: H. R. Bennett 8239 (W--2445792). MEXICO: Chihuahua: F. Robert s.n. [26-I-1966] (Ip); Stuessy 1014 (Ip, N). Guanajuato: Detling 9642 (Ip). Jalisco: J. Rzedowski 21919 (Ip). Nuevo León: Reséndez 78 (Au--222193).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Additional bibliography: Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 727. 1960; Moldenke, Phytologia 13: 183. 1966; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1317 & 1324. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Moldenke, Fifth Summ. 1: 45, 53, 57, 61, 63, 74, & 369 (1971) and 2: 654 & 912. 1971.

Howell & McClintock (1960) distinguish this variety by the statement "leaves merely cleft; found in most of the range of the species". It has been found growing in pine forests, flowering and fruiting in November.

The T. Collins 178, distributed as V. bipinnatifida var. latilobata, is actually V. ambrosifolia Rydb., while G. A. Voss 486 is V. ciliata var. longidentata Perry and Huerta M. 42 is V. menthaefolia Benth.

Additional citations: ARIZONA: Graham Co.: Keil, Pinkava, & Lehto 10150b (N). NEW MEXICO: Grant Co.: O. B. Metcalfe 177 (Se--159766). MEXICO: Michoacán: Hinton 13125, in part (Se--117449).

xVERBENA BLANCHARDI Moldenke

Additional bibliography: Moldenke, *Phytologia* 14: 277--278. 1967; Swink, *Pl. Chicago Reg.* 427. 1969; Moldenke, *Fifth Summ.* 1: 16, 21, 34, 38, 43, 53, & 369 (1971) and 2: 651, 654, 672--674, 695, & 912. 1971.

Swink (1969) records this hybrid from Cook County, Illinois.

Additional citations: ILLINOIS: Winnebago Co.: Bebb s.n. [Fountaindale] (W--2606270).

VERBENA BONARIENSIS L., *Sp. Pl.*, ed. 1, pr. 1, 1: 20. 1753 [not V. bonariensis Rendle, 1904, nor Schau., 1960].

Additional synonymy: Verbena bonariensis L. ex Heimans, Heinsius, & Thijsee, *Geillustr. Fl. Nederl.* 908. 1965.

Additional & emended bibliography: Dill., *Hort. Eltham.* 2: 406, pl. 300, fig. 387. 1732; Crantz, *Inst. Rei Herb.* 1: 573. 1766; [Retz.], *Nom. Bot.* 11. 1772; J. F. Gmel. in L., *Syst. Nat.*, ed. 13, pr. 1, 2: (1): 41 (1789) and ed. 13, pr. 2, 2 (1): 41. 1796; Balbis, *Cat. Pl. Hort. Bot. Taur.* 48. 1804; Balbis, *Cat. Stirp. Hort. Acad. Taur.* 80. 1813; Pers., *Sp. Pl.* 3: 347. 1819; Steud., *Nom. Bot. Phan.*, ed. 1, 873 & 874. 1821; Voigt, *Hort. Suburb. Calc.* 471. 1845; Harv., *Gen. S. Afr. Pl.*, ed. 2, 290. 1868; Vesque, *Ann. Sci. Nat. Paris*, ser. 7, 1: 339. 1885; Briq. in Chod. & Wilczek, *Bull. Herb. Boiss.*, ser. 2, 2: 543. 1902; T. Peckolt, *Bericht. Deutsch. Pharm. Gesell.* 14: 465--466. 1904; Fyson, *Fl. Nilg. & Puln. Hill-tops* 1: 319 & 320 (1915) and 2: fig. 214. 1915; Lowe, *Miss. State Geol. Surv. Bull.* 17: 237. 1921; F. B. H. Br., *Bishop Mus. Bull.* 130: 247. 1935; Cheymol, *Bull. Soc. Chim. Biol.* 19: 1647--1653. 1937; Cheymol, *Chem. Abstr.* 32: 2977. 1938; Baez, *Mus. Entre Ríos Cart. Herb. Paran.* 43. 1938; Fischer & Harshberger, *Flower Fam. Alb.* 86. 1941; Savage, *Cat. Linn. Herb. Lond.* 4. 1945; Howell, *Marin Fl.*, ed. 1, 233. 1949; Abrams, *Illustr. Fl. Pacif. States*, pr. 1, 3: 608 & 610, fig. 4340. 1951; Cabrera, *Man. Fl. Alred. Buenos Aires* 395. 1953; Michalowski, *Serv. Tecn. Interam. Coop. Agr. Bol.* 169. 1954; A. Burkart, *Darwiniana* 11: 383, pl. 16. 1957; Ferris in Abrams & Ferris, *Illustr. Fl. Pacif. States*, pr. 1, 4: 651 & 730. 1960; J. F. Macbr., *Field Mus. Publ. Bot.* 13 (5): 615--617, 621, & 624. 1960; Willaman & Schubert, *Agr. Res. Serv. U. S. Dept. Agr. Tech. Bull.* 1234: 237. 1961; M. Gray, *Contrib. N. S. Wales Nat. Herb.* 3: 61. 1961; Raven, *Quart. Rev. Biol.* 38: 161. 1963; Troncoso in Böcher, Hjerting, & Rahn, *Dansk Bot. Arkiv* 22 (1): 109. 1963; Balakrishnan, *Bull. Bot. Surv. India* 6: 87. 1964; R. Good, *Geogr. Flow. Pl.* 218. 1964; Radford, Ahles, & Bell, *Guide Vasc. Fl. Carol.* 281--282. 1964; Angely, *Fl. Anal. Paran.*, ed. 1, 570. 1965; Ferris in Abrams & Ferris, *Illustr. Fl. Pacif. States*, pr. 2, 4: 651 & 730. 1965; Heimans, Heinsius, & Thijsee, *Geillustr.*

Fl. Nederl. 908. 1965; Ohwi, Fl. Jap. 763. 1965; Troncoso in Cabrera, Fl. Prov. Buenos Aires 5: 128--131, fig. 45. 1965; Backer & Bakh., Fl. Java 2: 596. 1965; J. W. Vickery, Contrib. N. S. Wales Nat. Herb. 3: 478. 1965; Yotaro, Gard. Pl. World 1: 131 (1965) and 3: 127, pl. 64, fig. 2. 1966; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 276. 1966; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 610, fig. 4340. 1967; H. C. D. de Wit, Pl. World High. Pl. 2: 175 & 183, pl. 108. 1967; R. K. Gupta, Season, Fls. Ind. Sum. Resorts Moos. 132 & 154. 1967; Kunkel, Cuad. Bot. Mus. Canar. 1: 23. 1967; E. Lawrence, South. Gard., ed. 2, 114, 115, 172, & 214. 1967; Rickett, Wild Fls. U. S. 2 (2): 462, [463], & 685, pl. 170. 1967; Tingle, Check List Hong Kong Pl. 38. 1967; Hung Fung, Raymondia 1: 17 & 19. 1968; Burlage, Ind. Pl. Tex. 184, 206, & 227. 1968; Moldenke, Résumé Suppl. 16: 1, 6--8, 11, 12, & 28 (1968) and 17: 6 & 7. 1968; Moldenke, Phytologia 16: 184, 194, & 196. 1968; Munz & Keck, Calif. Fl. 686, 687, & 1679. 1968; W. T. Pope, Man. Wayside Pl. 192, 194, & 289, pl. 110. 1968; Rickett, Wild Fls. U. S. 3 (2): 364, [367], & 551, pl. 111. 1969; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 266. 1969; Hansen, Bol. Mus. Munic. Funchal 24: 34. 1969; H. B. Lovell, Glean. Bee Cult. 97: 99--100 & 122. 1969; H. L. Mason, Fl. Marshes Calif., pr. 2, 676 & 877. 1969; A. L. Moldenke, Phytologia 18: 126 & 127. 1969; A. Pedersen, Bot. Tidsskr. 64: [342], 349, & 357. 1969; M. A. Rau, Bull. Bot. Surv. India 10, Suppl. 2: 63. 1969; R. J. & C. Taylor, Rhodora 71: 218. 1969; Van den Schijff, Check List Vasc. Pl. Kruger Natl. Park 80. 1969; Anon., Biores. Ind. 6: 283. 1970; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Howell, Marin Fl., ed. 2, 233. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1314 & 1318. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1876 & 1877. 1970; Sykes, N. Zeal. Dept. Sci. & Indust. Res. Bull. 200: 215--216 & 314. 1970; Moldenke in Wiggins & Porter, Fl. Galáp. Isls. 505. 1971; Wiggins & Porter, Fl. Galáp. Isls. 997. 1971; Long & Lakela, Fl. Trop. Fla. 741--742 & 961. 1971; Rickett, Wild Fls. U. S. 5 (2): [455], 456, & 665, pl. 152. 1971; Moldenke, Fifth Summ. 1: 16, 18, 23, 25, 27, 30, 32, 33, 39, 47, 49, 53, 57, 64, 65, 101, 105, 120, 137, 143, 177, 184, 187, 189, 192, 200, 203--206, 231, 238, 241, 248, 252, 255, 257, 262, 264, 265, 269, 278, 281, 306, 311, 312, 328, 337, 341, 343, 344, 349--353, 369, 396, & 473 (1971) and 2: 653--655, 664, 667--670, 674, 681, 692, 696, 701, 703, 709, & 912. 1971.

Additional & emended illustrations: Dill., Hort. Eltham. 2: pl. 300, fig. 387. 1732; Fyson, Fl. Nilg. & Pulin. Hill-tops 2: fig. 214. 1915; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 608, fig. 4340. 1951; A. Burkart, Darwiniana 11: 383, pl. 16. 1957; Troncoso in Cabrera, Fl. Prov. Buenos Aires 5: 130, fig. 45. 1965; Yotaro, Gard. Pl. World 3: pl. 64, fig. 2 [in color]. 1966; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 608, fig. 4340. 1967; H. C. D. de Wit, Pl. World High. Pl. 2: 175, pl. 108 [in color]. 1967; Rickett, Wild Fls. U. S. 2 (2): [463], pl. 170 [in color] (1968), 3 (2): [367], pl. 111 [in color], and 5 (2): [455], pl. 152 [in color]. 1971.

The literature reference, "Dill., Hort. Eltham. 2: 381", is sometimes cited for Verbena bonariensis, but appears to be erroneous since on that page it is Thlaspi bonariensis (in the Brassicaceae) which is being discussed. The reference to R. J. & C. Taylor's work (1969), given above, occurs erroneously cited to volume "17" of Rhodora.

Recent collectors describe V. bonariensis as an erect herb, to 6 feet tall, the stems and leaves rough, the calyx green below to reddish above, the corolla-hairs white, the anthers yellow-green, and the pistil green. The corolla itself is described as "deep-mauve" on Bayliss BS.2236, "lilac" on Philson, Doore, & Nash 234, "dark-violet" on Nicora 663, "blue" on Ruiz Huidobro 1695, "purple" on Clemens 41317, Sykes 1014, Vega 862, and Walker 8133, and "violet" on Schwarz 5122, Stellfeld 1678, and Strid 2816, while Crosby, Hespenheide, & Anderson 231 is said to have had it "whitish below, reddish in central region, and lavender above". The label of Sidey 3772 is inscribed "shrub 4--5 ft. tall, flowers purple", but the word "shrub" here must certainly be erroneous.

The species has been found growing along roadsides, in damp swales, and among grass on slopes, flowering and fruiting in every month of the year.

Troncoso (1965) says of this species "Originaria de la Argentina, Brasil, Paraguay y Uruguay, introducida en Centro América y S. de Estados Unidos. Común en lugares húmedos, terraplenes, etc." She cites Lanfranchi 159, Cabrera 8496, and Dawson 698 from Buenos Aires.

Philson, Doore, & Nash found the plant growing on southerly-sloping hillsides in poor dry yellow soil, the Degeners report it naturalized on Viti Levu, while Radford, Ahles, & Bell (1964) report it from old fields and waste places, infrequent in the central part of North Carolina and throughout the central part and the piedmont of South Carolina, blooming there from May to October. Macbride (1960) cites Soukup 2911 from Lima and Raimondi s.n. from Arequipa, Peru, gives the extra-Peruvian distribution as "North of Paraguay, Argentina, Brazil", and comments "said to be an introduction in Peru". Brown (1935) records the species from Rapa and Pitcairn Islands, citing Stokes 195 from Rapa and Quayle X from Pitcairn. He states that the plant is called "titania" on Rapa. Lowe (1921) records it from Hinds and Wilkinson Counties, Mississippi, the former record being based on a T. P. Bailey collection. Voigt (1845) tells us that it is cultivated in India and this is confirmed by Balakrishnan (1964), while Healy found it "in waste land near [a] river" and "established on roadsides" in New Zealand and avers that "this species was not in the Kaituna Valley in 1936--40" and "not in the district previously, and almost certainly brought in via shingle from the Wairau River". Allison comments that it is "common on the northern part" of North Island, New Zealand.

Peckolt (1904) records the species from Alagoas in addition to other Brazilian states from which I have known it previously and lists the vernacular name "camará de capoeira". He comments that "Diese Pflanze wird sowohl hier als auch in anderen Ländern als Zierpflanze kultiviert; selbst verwildert. Sie besitzt lanzettlich, gesägte Blätter. Der Blütenstand in trugdoldigen Rispen mit lebhaft lilafarbenen Blüten. Die Blätter schmecken bitter, das Dekokt derselben wird bei Wechselfieber und chronischem Katarrh benutzt." Burlage (1968) reports that the plant contains an alkaloid.

Fyson (1915) says of his pl. 214 "(doubtful....Native of Brazil. Said to occur as an escape on the Nilgiris, but I have not seen it myself. Plants at Kew of the Himalayas and Nilgiris named by Clarke for the F. B. I. as this species, are V. venosa Gill and Hooker." Actually the co-author of the latter name is John Gillies (1747--1836), not the N. Gill who was collecting in India at about Fyson's time. Fyson's illustration is a perfect representation of typical V. bonariensis, a species which I have reason to believe has become naturalized in at least six states of India - Assam, East Punjab, Gujarat, Khasi States, Maharashtra, and Uttar Pradesh.

Sykes records the species from Niue Island, Hansen (1969) from Madeira, the Azores, and the Canary Islands, Tingle (1967) from Hongkong, and Pedersen (1969) as naturalized in Denmark. Gupta (1967) found it wild in Uttar Pradesh, India, describing its corollas as "lilac" in color. Gray (1961) reports it widespread and common generally along roadsides, in waste places, and in areas adjacent to railroad tracks in New South Wales. Ohwi (1965) comments that it is "Sometimes cultivated and naturalized in the western part of Honshu and Kyushu. -- Introduced from S. America" and describes the corollas as "blue-purple". Van der Schijff (1969) states that it is "Scattered in the southern part" of Kruger National Park, citing Van der Schijff 497 and Codd 5689. In Marin County, California, according to Howell (1970), it is "locally abundant in low ground".

Lawrence (1967) tells us that in the southern United States V. bonariensis starts blooming between May 9 and June 15 and ends at about November 25. Raven (1963) maintains that it "was clearly introduced from the southern hemisphere to the northern about 1925", but this statement is completely erroneous because it was collected in the northern hemisphere long before that date, e.g., in 1924 by Stacey in California, in 1921 by the Baileys, Whetzel, Degener, and McCallan in Bermuda, in 1918 by Bailey in Louisiana, in 1905 by Harshberger in Bermuda, in 1902 by Palmer in South Carolina, in 1899 by Cuthbert in Georgia, in 1890 by Hitchcock in Jamaica, in 1886 by Burke in New Jersey, in 1879 by Mellichamp in South Carolina, in 1875 by Curtiss in South Carolina, and in 1853 by Gibbes in South Carolina.

Kunkel (1967) cites Kunkel 7977 from Grand Canaria. Hutchison 63.740-S3 was cultivated in California from Canary Islands seed.

Wilczek & Chodat (1902) cite Wilczek 55 from Brazil.

Additional vernacular names for V. bonariensis, as recorded by various authors and collectors, in addition to the ones listed by me previous to this, are "Buenos Ayres verbena", "cluster-flowered verbena", "oh-kumatsuzura", "pretty verbena", and "sanjaku-bābena". Pope (1968) states that in Hawaii it is called "oi", but his illustration (pl. 110) purporting to depict it, actually represents V. litoralis H.B.K. instead!

Hirata (1966) reports that V. bonariensis is infested at times by the fungus, Erysiphe cichoracearum P. DC., in Australia. Herbarium material of V. bonariensis has been misidentified and distributed in some herbaria as V. rigida Spreng. On the other hand, the F. Wylie s.n. [September 1947] is V. bonariensis var. conglomerata Briq., Cours 78, Dahlstrand 829, D. F. Howe s.n. [9 July 1963], and O'Donnell & Rodriguez V. 283 are V. brasiliensis Vell., Cowgill 903 [Pl. Introd. 121505] is V. ovata Cham., and D'Arcy 1619, Mueller-Dombois 68051848, and Prain s.n. [Coonoon, Feb. 11, 1899] are V. rigida Spreng.

Additional citations: SOUTH CAROLINA: Aiken Co.: A. E. Radford 514 (N). McCormick Co.: A. E. Radford 22293 (Se--199290). Newberry Co.: C. R. Bell 9767 (N). FLORIDA: Dade Co.: Gillis 9248 (Go). Gadsden Co.: J. K. Small s.n. [River Junction, May 1928] (N, N). ARKANSAS: Bradley Co.: Demaree 19552 (Se--112347). OKLAHOMA: McCurtain Co.: Prater 60 (Au--122292); C. M. Rowell 10744 (Lk). CALIFORNIA: Marin Co.: J. T. Howell 19323 (Se--112734, Se--155405). JAMAICA: Crosby, Hespenheide, & Anderson 231 (N). BRAZIL: Paraná: Stellfeld 1678 [H.F.F. 5876] (W--2527751). Rio Grande do Sul: Palacios & Cuzzo 1150 (N). BOLIVIA: Cochabamba: J. Steinbach 9681 (W--1571477). PARAGUAY: Hassler 9643 (W--950560); T. Rojas 313a (Ws); Woolston 174 (N), 785 (W--2567992). URUGUAY: H. H. Bartlett 20710 (N). ARGENTINA: Buenos Aires: R. Alvarez 221 (N), 759 (N); Boffa s.n. [20-II-45] (N), s.n. [23-II-1945] (N); Nicora 663 (W--2595178); Ruiz Huidobro 1695 (N, N, Rf), 1771 (N). Chaco: Buratovich 509 (N), 522 (N); Vega 862 (N). Corrientes: G. J. Schwarz 187 (N); Wurth 34 (N). Formosa: I. Morel 2029 (N), 3171 (N), 3181 (N), 4004 (N), 4132 (N), 4352 (N), 4449 (N), 4548 (Ac, N), 4601 (N), 4705 (N), 4863 (N), 4989 (N), 5092 (N), 5230 (N), 5655 (N), 5913 (N), 6013 (N), 6335 (N). Misiones: G. J. Schwarz 5122 (N), 5384 (N); Schwindt 37 (Se--130301). Salta: Sotelo 888 (N). Santa Fé: E. Alvarez 984 (N). KENYA: Strid 2816 (Go). SOUTH AFRICA: Cape Province: Bayliss BS.2236 (N, W--2564423); Sidey 3772 (W--2527327). Natal: Sidey 3443 (W--2410478). Transvaal: Dahlstrand 179 (Go); Repton 304a (Se--112486). MADAGASCAR: Decary 18178 (Go). INDIA: Khasi States: Hooker & Thomson s.n. [Mont. Khasia, 1-3000 ped.] (W--2496746). State undetermined:

Wight s.n. [Peninsula Ind. orientalis] (Ed). OKINAWAN ISLANDS: Okinawa: Amano 7373 (W--2156317); E. H. Walker 8133 (Rf). NEW GUINEA: Territory of New Guinea: M. S. Clemens 41317 (W--2605771). NEW CALEDONIAN ISLANDS: New Caledonia: Guillaumin 8568 (N). FIJI ISLANDS: Viti Levu: Degener & Degener 32359 (N). NEW ZEALAND: North Island: K. W. Allison s.n. [12.1940] (Nz--36676), s.n. [23.3.62] (Nz--133500); Carse s.n. [21.II.1928] (Nz--5621); Healy s.n. [27.II.1945] (Nz--33966); Philson, Doore, & Nash 234 (N). South Island: Healy 59/509 (Nz--118245a, Nz--118245b), 66/329 (Nz--172804, Nz--172836). KERMADEC ISLANDS: Raoul: Sorensen 5 (Nz--55305). NIUE ISLAND: W. R. Sykes 1014 [Herb. Bot. Div. D.S. I.R. 169881] (Rf). CULTIVATED: California: Hutchison 63.740-S3 (W--2563186, W--2563187).

VERBENA BONARIENSIS f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 383 & 407. 1962; Angely, Fl. Anal. Paran., ed. 1, 570. 1965; Moldenke, Fifth Summ. 1: 177 & 200 (1971) and 2: 912. 1971.

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Moldenke, Résumé Suppl. 16: 1 & 6 (1968) and 17: 7. 1968; Moldenke, Phytologia 15: 488. 1968; Moldenke, Fifth Summ. 1: 16, 25, 39, 65, 92, 177, 187, 189, 200, 350, & 369 (1971) and 2: 912. 1971.

This plant is described by recent collectors as growing 40--70 cm. tall. It was found growing at 660 m. altitude, fruiting in March and from October to January. The corolla is described as "blue" on Ibarrola 1784 & 1963 and Ruiz Huidobro 1660 and as "purple" on Ibarrola 1241. In New Zealand Parham found it "casual in waste land", while Healy found "a small colony rooted in story flats, not seen elsewhere in C. Otago". Albers found it cultivated in Ethiopia and described it as an "ornamental cultigen". Actually it is a natural variety, not a cultivar.

Additional citations: BRAZIL: Rio Grande do Sul: Palacios & Cuezco 287 (N), 2469 (N). PARAGUAY: Hassler 8934 (Ca--950557). ARGENTINA: Buenos Aires: Ruiz Huidobro 1666, in part (N). Corrientes: Ibarrola 1241 (N), 1784 (N), 1963 (N); Palacios & Cuezco 2159 (N). Formosa: I. Morel 3752 (N), 3871 (N), 4201 (N), 5062 (N). NEW ZEALAND: South Island: Healy 58/226 (Nz--121340); Parham s.n. [Healy 66/245] (Nz--172671). CULTIVATED: California: F. Wylie s.n. [September 1947] (Sd--52699). Ethiopia: C. C. Albers 61109 (Au--223900).

VERBENA BRACTEATA Lag. & Rodr.

Additional & emended synonymy: Verbena bracteata Cav. ex Balbis, Cat. Pl. Hort. Bot. Taur. 48. 1804. Verbena repens Spreng. ex Steud., Nom. Bot. Phan., ed. 1, 873 & 874, in syn. 1821 [not

V. repens Bertol., 1806, nor Larrañ., 1959, nor Savi, 1825, nor Ten., 1947]. Verbena bractiosa Michx. ex A. Wood, Class-book, [ed. 42], pr. 1, 537, sphalm. 1861. Verbena bracteata Lag. & Rodr. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena bractata Lag. & Rodr. ex Moldenke, Fifth Summ. 2: 656, in syn. 1971. Verbena bracteata Log. & Rodr. ex Moldenke, Fifth Summ. 2: 656, in syn. 1971. Verbena bracteosa Lag. ex Moldenke, Fifth Summ. 2: 656, in syn. 1971.

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Recent collectors describe this plant as an annual, with regular flowers, the stamens 4, equally inserted in the lower part of the corolla-tube. Weber (1967) describes it as "Floral bracts leaf-like, equalling or exceeding the flowers; plants usually prostrate.....Common along roadsides, on the mesas and plains" in the Rocky Mountains. It has been found growing in dry sand, limestone or prairie soil, sandy soil or sandy loam, tight sandy loam and the deep sand of moving dunes, in tight clay loam margins of playa lakes or limestone loam, in old cotton fields on deep loam, red sandy loam and limestone ledges on creek banks, in ditches on level prairie of wheat areas, in dry open ground, riparian habitats, the disturbed soil of roadsides, rocky sandy well-packed soil, cracks of pavement of old roads, scattered pine woods, in Coleogyne-Artemisia and Artemisia-pinyon-juniper plant associations.

Hitchcock, Cronquist, & Ownbey (1959) call it a "Taprooted annual or more often perennial, usually with numerous prostrate or decumbent sparsely spreading-hirsute stems 1--6 dm. long, small plants rarely single-stemmed and erect", growing in "Roadsides and other disturbed habitats; B. C. to Me., s. to Calif., Mex., and Fla., probably not native in the n.e. part of its range." Reed & Hughes (1970) refer to it as an "Annual herb, reproducing by seeds", found "In meadows, pastures, barnyards, sandy prairies, lawns, and waste places; rarely in cultivated fields. Native. Throughout most of the United States excepting northern New England and New York, northeastern Minnesota, and a large area of the Rocky Mountains; north into Canada from southern Ontario to

British Columbia; south into Mexico."

Swink (1969), in his work on the Chicago region, says that V. bracteata is found in "All 22 counties. Although the natural range of this plant, as given by the manuals, includes the Chicago region, yet the plant itself is a weed which is not a part of any native community. It is regularly found in heavily used, man-made habitats. It is frequent along railroads, occurring with Chaenorrhinum minus, Chenopodium album, Eragrostis pectinacea, Eragrostis poaeoides, Euphorbia maculata, Euphorbia supina, and Setaria viridis. In disturbed sandy soil it is found with Ambrosia artemisiifolia elatior, Cenchrus longispinus, Erigeron canadensis, Mollugo verticillata, and Plantago lanceolata. It often grows on the edges of roads, where the traffic is moderate, associating with Amaranthus graecizans and Polygonum aviculare."

Nelson (1969) reports that it "occurs as a weed in gardens, fields and along roadsides over most of North America and is found up to 7,500 feet in Colorado". Dobbs (1963) found it "Rather infrequent in dry sandy fields and on sandy embankments....perhaps more frequent along railroads" in Henry County, Illinois, while in Pope County it is said by Mohlenbrock (1968) to be only "occasional along roadsides". Boughey (1968) found it only occasional in wet places in Orange County, California, citing Johnson 11285. In the Pacific Northwest Gilkey & Dennis (1967) found it to be occasional in waste places. Lakela (1965) considers it rare in north-eastern Minnesota (citing Lakela 18529), while Montgomery (1966) gives its Canadian distribution, again, as "Ont. to B. C." Lowe encountered it in dry open waste places in Grenada and Lafayette Counties, Mississippi, Wunderlin (1966) refers to it as frequent in waste ground in Carroll County, Illinois (citing Wunderlin 472), Fraser & Russell (1953) say that it inhabits dry prairies and cultivated fields in Saskatchewan, while the Winters & Van Bruggen (1959) record it as growing on the "prairies and plains over the state" of South Dakota.

Rowell (1971) avers that in Texas V. bracteata grows in "sand and clay loams particularly in disturbed areas of prairies and grasslands, often very abundant in Prairie Dog Towns and the outer edges of playa lakes", flowering there from April to late September. He records it from Armstrong, Bailey, Dallam, Dawson, Dickens, Floyd, Garza, Hartley, Hemphill, Hockley, Hutchinson, Lamb, Lipscomb, Lubbock, Lynn, Ochiltree, Parmer, Randall, Roberts, Terry, and Wheeler Counties. He also found it growing "Occasional in sandy loam near stock tanks on open prairie", "occasional in tight sandy loam near cattle tanks", and "locally abundant in disturbed areas around prairiedog towns". In the same state Collins encountered it "in deep sand of the High Plains dominated by mesquite and grasses", Trlicka & Sellars report that it is found frequently growing from cracks in pavement or in low protected areas, and Waller found it abundant in the clay-loam margins of playa lakes, occasional in sandy clay roadside ditches, and in dense stands of Bromus japonicus.

Domville & Dunbar (1970) inform us that in Ulster County, New York, V. bracteata is "frequent in waste places and along railroads, flowering in summer", Radford, Ahles, & Bell (1964) found it to be rare in waste grounds in Clay, Forsyth, Iredell, McDowell, and Orange Counties, North Carolina, flowering there from June to October, in Washington and adjacent Idaho St. John (1963) reports it common in dry places and persisting as a weed in dry farming regions in the Upper Sonoran and Arid Transition Timberless life zones, while in Arizona it is found "almost throughout the state, 1000—7500 ft., waste land and river bottoms, May—September", according to Howell & McClintock (1960). Moran describes it as occasional near the edges of drying pond beds in Baja California, Atwood found it growing with Conyza, Erigeron, Glycyrrhiza, Nicotiana, Oenothera, Solidago, and Veronica in Butte County, Montana, while Gierisch says that it is common in sandy soil of rabbitbrush communities in Colorado. In Cloud County, Kansas, McGregor found it to be common in roadside banks and at the edges of fields. In Yakima County, Washington, Andrew & Alison Moldenke describe it as a sympatric weed in horse pastures, "with no hybrids present".

Holmgren, Reveal, & LaFrance report it as locally abundant along roadsides in Utah, Holmgren & Reveal found it only infrequent in wet gravelly soil along the levees of ditches in Nevada, and Richardson & Robertson call it "abundant" in dry overgrazed pastures in Kansas and "common" on dry sandy prairies in Nebraska.

Wherry (1967) records the species from Delaware County, Pennsylvania, Higgins (1967) from Washington County, Utah (citing L. C. Higgins 623), and Wheeler (1900) from Houston County, Minnesota (citing W. A. Wheeler 635). Cochrane and his associates (1971) refer to it as infrequent along dry roadsides in Rock County, Wisconsin.

Boughhey, Bridges, & Ikeda (1968) have computerized the characters of this species as follows: "Binomial = Verbena bracteata; Distribution habitat = wet places; Habit type = annual or perennial; Stem branching = diffuse; Stem length in cm. = 10 to 50; Leaf arrangement = petiolate; Leaf-shape = lobed and oblong or obovate; Leaf blade length in cm. = 1 to 4; Petiole length in mm. = 5 to 15; Petiole shape = winged; Floral bracts length in mm. = 5 to 10; Calyx length in mm. = 3 to 4; Corolla color = blue; Corolla length in mm. = 3 to 4; Fruit largest dimension in cm. = 0.2."

The corolla color is described as "light blue to purplish" by Nelson (1969), "blue, pinkish, or rarely white" by Gilkey & Dennis (1967), "purplish blue" by Reed & Hughes (1970), "light-purple" on Duncan 12696, "blue" on Bartlett & Grayson 862, Galloway 27, Moran 16110, Perdue 6093, and Reveal & Beatley 1554, "pinkish-blue" on Reveal 1504, "lavender" on Gentry & Jensen 2255, Watts s.n., and Whitehouse 9926, "pink" on Irving s.n., "blue-violet" on Holmgren & Reveal 1023, "blue-purple" on Trlica & Sellars 30, "pale-purple" on Rowell 4037 & 5384a, and "purple" on Hutchins 430 and Rowell 11529.

Additional common names recorded for V. bracteata, besides the ones previously listed by me, are "bigbract verbena", "bigtract verbena", "bracted-vervain", "creeping vervain", "largebracted vervain", "prostrate verbena", and "water cress" (as recorded on E. L. Reed 3774, probably in error).

It is worth noting here that the synonymous name, V. bracteosa Michx., is typified as follows: "In the region of Illinois and in the town of Nashville", Tennessee. The Verbena repens of Bertolini, of Larrañaga, and of Savi, referred to in the synonymy of V. bracteata, are all synonyms of Phyla nodiflora (L.) Greene, while V. repens of Tenore is a synonym of Phyla nodiflora var. rosea (D. Don) Moldenke.

Sutcliffe (1969) reports that the lace-bug, Tateonemia nigrina Champ., seems to be host-specific on Verbena bracteata in Nevada. Shinn (1967) reports that it is visited by the bee, Calliopsis andreniformis. Thornberry (1966) notes that the plant is attacked by the fungi, Puccinia vilfae Arth. & Holw. (a rust) in Nebraska and Septoria verbenae Rob. (a leaf-spot) in Idaho, Kansas, South Dakota, and Wisconsin. Hirata (1966) reports that it is attacked by the powdery mildew, Erysiphe cichoracearum P. DC., in various parts of the United States. Zufall & Richtman (1944) isolated the chemical, cornin, from the plant, while Burlage (1968) reports that V. bracteata is "valuable as an alterative in scrofulous affections and is used to stop post-partum hemorrhage" in Texas.

The H. R. Bennett s.n. [August 2, 1957] collection, cited below, bears a notation "Evidently a hybrid with V. stricta Vent. or some other species", but looks like the ordinary erect form of V. bracteata to me — I see no evidence of hybridity present.

Material of V. bracteata has been misidentified and distributed in some herbaria as V. neomexicana (A. Gray) Small. On the other hand, the D. B. Dunn 3050, distributed as V. bracteata, is actually V. ambrosifolia Rydb., E. G. Marsh 1133 and Roybal 97 are V. canescens H.B.K., E. G. Marsh 1792 is V. canescens var. roemeriana (Scheele) Perry, Mears 1744 is V. gooddingii var. nepetifolia Tidestr., Matthews & Matthews 487 is V. gracilis Desf., and Ohlenbush 40, F. Parks 51, D. W. Patterson s.n. [9 May 1966], and C. M. Rowell 10766 are V. pumila Rydb.

Additional citations: ONTARIO: Lambton Co.: C. K. Dodge s.n. [7/8/97] (Lk, Lk, Lk). SASKATCHEWAN: Maple Creek Co.: J. A. Campbell 95 (Ld). BRITISH COLUMBIA: Kootenay Co.: Mulligan & Woodbury 2064 (Se—167767). Yale Co.: Calder & Savile 9668 (Se—177278); Senn, Frankton, & Gillett 5800 (Se—141451); J. W. Thompson 14374 (Ld, Mi). NEW YORK: Suffolk Co.: E. J. Alexander s.n. [Montauk Point] (N). GEORGIA: Clarke Co.: W. H. Duncan 12696 (N). Floyd Co.: Ravenel s.n. [Rome] (N). OHIO: Gallia Co.: Bartley 2897 (N). Jackson Co.: Bartley 2739 (N). ILLINOIS: Cook Co.: H. R. Bennett s.n.

[July 6, 1957] (Se--178170). Marion Co.: Bebb s.n. [Salem, 1860] (W--2606271). Peoria Co.: V. H. Chase 17457 (Se--224219). IOWA: Winneshiek Co.: Tolstead s.n. [July 10, 1933] (Se--104170). MICHIGAN: Saginaw Co.: Davis & Davis 8953 (Se--127869). WISCONSIN: Racine Co.: Hale s.n. (W--2606305). MINNESOTA: Hennepin Co.: S. F. Blake 325 [Herb. Blake 1279] (Id). Ramsey Co.: S. F. Blake 343 [Herb. Blake 1297] (Id). SOUTH DAKOTA: Fall River Co.: G. N. Jones 35991 (Se--221827). Jones Co.: I. L. Wiggins 14976 (Ip). KANSAS: Cheyenne Co.: S. Stephens 11773 (N). Cloud Co.: R. L. Mc Gregor 4833 (N). Douglas Co.: W. H. Horr E.570 (N). Hamilton Co.: Croat 2073 (N). Kiowa Co.: Horr & McGregor 3790 (N). Ottawa Co.: Richardson & Robertson 711 (N). Scott Co.: S. Stephens 11325 (N). MISSOURI: Saint Louis: Muehlenbach 2660 (Rf), 2707 (Ac), 3474 (Ac). ARKANSAS: Craighead Co.: Demaree 27044 (N). Washington Co.: F. L. Harvey 62 (Mi). MONTANA: Broadwater Co.: Hitchcock & Muhlick 11825 (Se--99728). Carter Co.: W. E. Booth 2669 (Se--146593). Flathead Co.: W. E. Booth 6380 (Se--234896). Gallatin Co.: J. W. Blankinship s.n. [July 22, 1898] (Mi); Hitchcock & Muhlick 12478 (Se--100432). Lake Co.: J. H. Thomas 10792 (W--2574498). Park Co.: Hitchcock & Muhlick 13567 (Se--99729). Pondera Co.: Bartlett & Grayson 400 (Au--263469, N, Se--236934). Powell Co.: Hitchcock & Muhlick 11520 (Se--99518). Rosebud Co.: H. R. Bennett s.n. [7-25-57] (N), s.n. [August 2, 1957] (N). Sweetgrass Co.: Hitchcock & Muhlick 13305 (Se--99544). IDAHO: Butte Co.: Atwood 1143 (N). Elmore Co.: Hitchcock & Muhlick 22627 (N, Se--214642). Idaho Co.: Q. Jones 366 (Se--143782). Nez Perce Co.: Ownbey & Weber 2736b (Se--138404), 2746a (Se--135818). WYOMING: Big Horn Co.: Tresler 323 (Se--235249). Platte Co.: C. L. Porter 3987 (Se--109580). UTAH: Garfield Co.: H. Buchanan 464 (Se--202826); Holmgren, Reveal, & LaFrance 2101 (N, Se--231680). Salt Lake Co.: C. C. Albers 53034 (Au--271564). Washington Co.: C. C. Albers 51078 (Au--271517); Gentry & Jensen 2255 (N). NEVADA: Clark Co.: Clokey 8096 (Sd--34377). Lincoln Co.: Reveal & Beatley 1554 [Herb. U. S. Atomic Energy Comm. 6565] (N). Nye Co.: Reveal 1504 [Herb. U. S. Atomic Energy Comm. 6209] (N). White Pine Co.: Holmgren & Reveal 1023 (N, Se--226192). COLORADO: Boulder Co.: C. C. Albers s.n. [Boulder, 7-6-60] (Au--262064); Ewan s.n. [Pl. Exsicc. Gray. 1090] (Se--169684). El Paso Co.: A. Brown s.n. [Garden of the Gods] (N). Larimer Co.: R. Irving s.n. [7 July 1963] (Au--270915). Pueblo Co.: A. Brown s.n. [July 17, 1878] (N). Rio Grande Co.: Gierisch 928 (N). Sedgwick Co.: W. A. Weber 6407 (Se--144903). NEBRASKA: Harlan Co.: Richardson & Robertson 834 (N, N). Lancaster Co.: E. Robinson s.n. [July 3, 1935] (Se--153074). OKLAHOMA: Beaver Co.: R. Gardner 20 (Lk).

Comanche Co.: E. J. Palmer 11750a (N). Texas Co.: L. A. Quinn 103 (Lk). TEXAS: Andrews Co.: T. Collins 225 (Lk). Carson Co.: Trlica & Sellars 30 (Lk). Crosby Co.: Galloway 27 (Lk). Dallam Co.: C. M. Rowell 5384a (Lk), 5401a (Lk); Turner & Melchert 4800 (Lk). Dawson Co.: E. L. Reed 3774 (Lk). Deaf Smith Co.: Waller 741 (Lk), 747 (Lk), 1345 (Lk). Ector Co.: T. Collins 1169 (Lk); C. M. Rowell 11529 (Lk). Garza Co.: B. Hutchins 430 (Lk). Hale Co.: Whitehouse 9926 (N). Hartley Co.: C. M. Rowell 5384a (Lk). Hemphill Co.: C. M. Rowell 4037 (Lk). Hockley Co.: E. L. Reed 3058 (Lk). Hutchinson Co.: C. Drake 171 (Au--246588); Wiles 460 (Lk). Lamb Co.: Hargrove & Tilton HT.500652 (Lk). Lubbock Co.: Demaree 7704 (Lk, Lk); G. McDonald s.n. [3 August 1964] (Lk, Lk); M. Mitchell s.n. [4/14/37] (Lk); E. L. Reed 3940 (Lk, Lk, Lk, Lk); C. M. Rowell 60-024 (Lk); Studhalter 1255 (Lk, Lk, Lk); R. Watts s.n. [June 8, 1961] (Lk); Wester s.n. [May 2, 1964] (Lk). Lynn Co.: E. L. Reed 3439 (Lk). Moore Co.: Jespersen & Jespersen 2708 (Se--184128). Ochiltree Co.: C. M. Rowell 10947 (Lk); C. Wallis 4755 (Lk). Parmer Co.: C. M. Rowell 8631 (Lk). Randall Co.: C. M. Rowell 10182 (Lk). Roberts Co.: C. Wallis 4978 (Lk). Terry Co.: E. L. Reed 3774 (Lk). Wheeler Co.: C. M. Rowell 10105 (Lk). NEW MEXICO: Bernalillo Co.: Marcelline 2525 (Mi). San Miguel Co.: Studhalter & Marr S.3028 (Lk). Santa Fé Co.: Perdue 6093 (W--2451219). Sierra Co.: O. B. Metcalfe 897 (N). Taos Co.: Hein s.n. [June 30, 1946] (Ws). ARIZONA: Coconino Co.: Gaines 1049 (Se--230762), 1150 (Se--230760), 1179 (Se--230761); H. H. Rusby s.n. [Oak Creek, May 30, 1883] (Mi); P. O. Schallert s.n. [6/16/43] (Sd--30208). Gila Co.: Pinkava, Keil, & Lehto 14210 (N). WASHINGTON: Adams Co.: R. G. Jeffrey s.n. [June 22, 1946] (Se--117633). Benton Co.: C. Nelson s.n. [Sept. 11, 1954] (Se--153410). Chelan Co.: Hedgcock s.n. [July 22, 1932] (Se--97119); Purer 7792 (Sd--33690). Grant Co.: H. W. Smith 1178 (Se--221043). Spokane Co.: Suksdorf 1976 (Se--119502). Stevens Co.: Beattie 11728 (N). Yakima Co.: Moldenke & Moldenke 3124 (Ac, Au, Go, Rf). County undetermined: T. Howell s.n. [Lower Cascades, June 1885] (Se--159730). OREGON: Baker Co.: W. A. Weber 3148 (Se--117662). Deschutes Co.: Brenckle 51440 (N). Harney Co.: Cronquist 8570 (Se--211459). Umatilla Co.: E. Rogers s.n. [September 2, 1954] (Se--158604); W. A. Weber 2106 (Se--117663). Union Co.: Bartlett & Grayson 862 (N, Se--236717). CALIFORNIA: Kings Co.: D. F. Howe s.n. [17 July 1964] (Sd--60963). Mono Co.: Moldenke & Moldenke 24495 (Ac, Lk, Rf). Santa Barbara Co.: H. M. Pollard s.n. [March 30, 1959] (Au--273434). Stanislaus Co.: Bacigalupi & Constance 8701 (Se--225425). Ventura Co.: H. M. Pollard s.n. [July 25, 1959] (Au--275246). MEXICO: Baja California: R.

Moran 16110 (W--2571402a). Coahuila: E. G. Marsh 1214 (Au--213009).

VERBENA BRACTEATA f. ALBIFLORA (Cockerell) Moldenke

Additional bibliography: Moldenke, Phytologia 13: 185. 1966; Moldenke, Fifth Summ. 1: 51 & 64 (1971) and 2: 657 & 913. 1971.

VERBENA BRASILIENSIS Vell.

Additional & emended synonymy: Verbena braziliensis Vell. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947; Bostick, Castanea 36: 206. 1971. Verbena braliliense Vell. ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena braziliense Mears ex Moldenke, Fifth Summ. 2: 657, in syn. 1971.

Additional & emended bibliography: Link, Enum. Pl. Hort. Berol. 2: 126. 1822; Cabrera, Man. Fl. Alred. Buenos Aires 395. 1953; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 615, 617, & 621. 1960; Hocking, Excerpt. Bot. A.6: 91 & 534. 1963; Radford, Ahles, & Bell, Guide Vasc. Fl. Carol. 281. 1964; Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Rickett, Wild Fls. U. S. 2 (2): 462, [463], & 685, pl. 170. 1967; Carter & Jones, Castanea 33: 203. 1968; Munz, Suppl. Calif. Fl. 101. 1968; Pullen, Jones, & Wats., Castanea 33: 332. 1968; Moldenke, Résumé Suppl. 16: 2, 6, & 13 (1968) and 17: 7. 1968; Moldenke, Phytologia 16: 185. 1968; A. L. Moldenke, Phytologia 18: 126 & 127. 1969; Angely, Fl. Anal. & Fitogeogr. Est. S. Paulo, ed. 1, 1: xli. 1969; Hansen, Bol. Mus. Munic. Funchal 24: 34. 1969; R. J. & C. Taylor, Rhodora 71: 218. 1969; N. F. Good, Biol. Abstr. 51: 461. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1318. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Bostick, Castanea 36: 206. 1971; Moldenke, Fifth Summ. 1: 21, 23, 25, 27, 30, 32, 33, 47, 49, 53, 57, 64, 65, 75, 101, 120, 137, 143, 177, 184, 187, 189, 192, 200, 257, 262, 350, 351, & 370 (1971) and 2: 654, 655, 657, 664, 672, 680, 681, 687, & 913. 1971.

Additional illustrations: Rickett, Wild Fls. U. S. 2 (2): [463], pl. 170 [in color]. 1967.

The Taylor (1969) reference cited above has been cited erroneously to volume "17" instead of volume 71.

The species has been collected in fruit in January and March (in addition to the months previously reported). Steinbach describes its calyx as "verdoso ocre". The corollas are said to have been "purple" on Aguilar 1139, Sota 41, and Villafañe 833, "blue" on Ruiz Huidobro 1473 and Steinbach 699, "lilac" on Luna 385 & 452 and Semper 293, "deep-pink" on Gillis 7057, "violet-blue" on Semper 384, "blue-violet" on LaRosa & Riccio 1485, and "lavender" on Bayliss BS.3045. Recent collectors have found it growing in tall-grass grassland, old fields, and on pond margins. Iltis encountered it in "shallow soil on prairie over calcareous Cretaceous rock" in Alabama, Demaree found it "common in poor soil on flats" in Arkansas, and Cory refers to it as "frequent on road

embankments" in Texas. Radford, Ahles, & Bell (1964) report it from old fields and waste places, "infrequent in the north and frequent in the south central part" of North Carolina, "common in the central part and frequent in the piedmont" of South Carolina, blooming there from May to October. In New Zealand it is said by Healy to be found "along gutters in town", while in South Africa, according to Dahlstand, it grows on "building lots with small riverheads and limited grazing, being lightly wooded with Protea caffra and with granite bottom".

Pullen, Jones, & Watson (1968) record V. brasiliensis from Amite, Calhoun, Clarke, Franklin, Greene, Hancock, Harrison, Hinds, Issaquena, Jackson, Jasper, Jefferson, Jefferson Davis, Jones, Lafayette, Lamar, Lauderdale, Lawrence, Marion, Montgomery, Perry, Pike, Quitman, Scott, Simpson, Stone, Tate, Union, Walthall, Warren, Washington, Wayne, Wilkinson, and Yazoo Counties, Mississippi. The Taylors (1969) record it from Johnston County, Oklahoma, Carter & Jones (1968) from Forrest County, Mississippi, and Macbride (1960) from Cajamarca, Cuzco, Huánuco, Junin, and La Libertad, Per.

Munz (1968) distinguishes V. brasiliensis from V. litoralis as follows:

1. Inflorescence lax, elongate; flowers distant; pubescence on rachis, bractlets, and calyx very minute, closely appressed. V. litoralis.
- 1a. Inflorescence dense, contracted; flowers mostly congested; pubescence of rachis, bractlets, and calyx spreading..... V. brasiliensis.

The Thomas, Thomas, & Thomas 708, distributed as V. brasiliensis, is actually V. montevidensis Spreng.

Additional citations: SOUTH CAROLINA: Horry Co.: J. A. Duke 0196 (Se--199292). Lexington Co.: A. E. Radford 27035 (N). FLORIDA: Dade Co.: Gillis 7057 (Rf). ALABAMA: Sumter Co.: Iltis & Univ. Wisc. Plant Geogr. Field Trip 25116 (Ws). MISSOURI: Saint Louis: Muehlenbach 3439 (Rf). ARKANSAS: Conway Co.: Demaree 35218 (Rf). Lafayette Co.: Demaree 58064 (Ac, Rf). LOUISIANA: Allen Par.: N. C. Henderson 63-1039 (Au--225646). TEXAS: Harris Co.: Collector undetermined 23 (Au--248743); Mears 546 (Au--249680). Jefferson Co.: C. L. Lundell 14136 (N). Orange Co.: Cory 50840 (Mi). CALIFORNIA: Yuba Co.: D. F. Howe s.n. [9 July 1963] (Sd--56769). COLOMBIA: Cundinamarca: Barkley & Wrigley 38779 (Ac). PERU: Junín: Iltis, Iltis, Ugent, & Ugent 347 (W--2558163); La Rosa & Riccio 1485 (Ac). BRAZIL: Rio Grande do Sul: Palacios & Cuezco 714 (N). BOLIVIA: Cochabamba: R. F. Steinbach 699 (N). ARGENTINA: Buenos Aires: R. Alvarez 228 (N), 503 (N), 561 (N); Rufz Huidobro 1473 (N); Sota 41 (N). Chaco: R. M. Aguilar 1139 (N). Córdoba: O'Donell & Rodríguez V. 283 (N); Pierotti s.n. [27/I/1944] (N). Formosa: I. Morel 2088 (N), 3902 (N), 4517 (N),

5337 (N). La Rioja: M. P. Gomez 35 [Herb. Inst. Miguel Lillo 106843] (N). Mendoza: E. M. Garcia 418 (N); Semper 293 (N, Rf), 342 (N), 384 (N); Villafañe 833 (N). Misiones: Krapovickas & Cristóbal 14692 (Ac). Salta: Luna 385 (N), 452 (N). San Luis: Varela 566 (N). Santiago del Estero: Pierotti "h" [Herb. Inst. Miguel Lillo 100888] (N). SOUTH AFRICA: Cape Province: Dahlstrand 829 (Go). Province undetermined: Bayliss BS.3045 [Komgha, Trans-kei] (N). MADAGASCAR: Cours 78 (W--2494549). NEW ZEALAND: South Island: Healy 61/57 (Nz--122993).

VERBENA BRASILIENSIS var. SUBGLABRATA Moldenke

Additional bibliography: Moldenke, Phytologia 15: 491. 1968; Moldenke, Fifth Summ. 1: 192 (1971) and 2: 913. 1971.

VERBENA CABRERAE Moldenke

Additional synonymy: Glandularia cabreræ Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 205, nom. nud. 1970.

Additional bibliography: Moldenke, Phytologia 15: 491. 1968; Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 205. 1970; Moldenke, Fifth Summ. 1: 184 & 200 (1971) and 2: 657 & 913. 1971.

The corollas on Schulz & Varela 5405 are described as having been "blue", while on Müller 145 they were "rose".

Additional citations: BOLIVIA: Santa Cruz: I. Peredo s.n. [20-I-1947] (Se--129882); R. F. Steinbach 321 (W--2533275). ARGENTINA: Catamarca: Luna Risso 259 (N); B. L. Müller 145 (N). Salta: Schulz & Varela 5405 (N). Santiago del Estero: Ruíz Huidobro 3079 (Se--130308).

VERBENA CALIFORNICA Moldenke

Additional bibliography: Munz, Suppl. Calif. Fl. 101. 1968; Moldenke, Phytologia 15: 491. 1968; Moldenke, Fifth Summ. 1: 65 & 370 (1971) and 2: 913. 1971.

Munz (1968) comments that "Moldenke has described V. californica from Keystone, Tuolumne Co. which keys out to V. bracteata, but is said to have a fruiting calyx 3.5--4 mm. long; corolla not known."

My son, Dr. Andrew R. Moldenke, has collected this plant along a small stream (Six Bit Creek) along the side of Taylor Hill, south of Chinese Camp, and I accompanied him later on his second visit to the locality. The species grows very abundantly along both forks of the stream, in an area which is in danger of eventually being destroyed either by the waters of an artificial lake or by real estate developments. It is growing in company with and closely associated with Trichostema rubrisepalum Elm., Rhamnus californica ssp. tomentella (Benth.) C. B. Wolf, Senecio foetidus Howell, Salix laevigata Bebb, Mimulus floribundus Dougl., Stachys stricta Greene, Hordeum nodosum L., Polypogon lutosus (Poir.) A. S. Hitchc., Madia citriodora Greene, Boisduvalia densiflora (Lindl.) S. Wats., Cen-

taurium venustum (A. Gray) Robinson, Juncus mexicanus Willd., and Scirpus olneyi A. Gray [A. R. Moldenke nos. 3398--3411, in sequence]. He describes the corollas as white, but pink inside the throat, and found the following bees visiting them: Anthidium edwardsii, Anthophora urbana, Chalcidoma angelarum, and Melissodes lupina [Anthidium and Chalcidoma belonging in the Megachilidae, Anthophora and Melissodes in the Anthophoridae]. He found in 1970--1971 that these were apparently the only insects of any sort visiting the flowers. It is his opinion that the locality we visited is actually the type locality of the species, even though this was described as "3 miles north of Keystone", the latter being a place name not now in use.

Additional citations: CALIFORNIA: Tuolumne Co.: R. F. Hoover 3613 (Sd--58403); A. R. Moldenke 3397 (Rf, Z); Moldenke & Moldenke 25240 (Ac).

VERBENA CALLIANTHA Briq.

Additional bibliography: Moldenke, Phytologia 16: 185, 188, & 212. 1968; Moldenke, Fifth Summ. 1: 177, 184, 187, & 200 (1971) and 2: 658, 662, 667, 683, & 913. 1971.

This plant has been collected in anthesis in April and both in anthesis and in fruit in April and December. The corollas are described as "blue" on Ibarrola 341, "violet" on Lourteig 2041 and Schwarz 425, and "purple" on Ruíz Huidobro 2105. Herbarium material has been misidentified and distributed in some herbaria under the binomial designation "Verbena soreoclada Briq."

Dr. A. Krapovickas, in a letter to me dated July 3, 1968, says "Con respecto a Verbena calliantha, solo tengo evidencia circunstancial sobre su origen híbrido. La coleccioné en un terreno donde crecían numerosos ejemplares de V. tenuisecta y V. incisa y solamente dos individuos de V. calliantha, con aspecto intermedio entre las dos primeras especies. Tengo en cultivo plantas de estas poblaciones y los dos individuos de V. calliantha fallan en la producción de semillas fértiles y en análisis citológico muestran algunas fallas en la meiosis". He states that he plans to continue his studies of this taxon. The hybrid previously described between V. tenuisecta Briq. and V. incisa Hook. is xV. trinitensis Moldenke, which see.

Additional citations: PARAGUAY: Lourteig 2041 (S); Woolston 623 (N). ARGENTINA: Corrientes: Ibarrola 341 (N); Ruíz Huidobro 2105 (N); J. G. Schwarz 425 (N). Formosa: I. Morel 6318 (N).

VERBENA CALLIANTHA var. MICROSOMA Briq.

Additional bibliography: Moldenke, Phytologia 8: 420--421. 1962; Moldenke, Fifth Summ. 1: 187 (1971) and 2: 913. 1971.

VERBENA CAMERONENSIS L. I. Davis

Additional synonymy: Verbena cameronensis L. ex Moldenke, Fifth Summ. 2: 658, in syn. 1971.

Additional bibliography: Hocking, Excerpt. Bot. A.6: 91. 1963; Moldenke, Phytologia 16: 185. 1968; Rickett, Wild Fls. U. S. 3 (2): 364. 1969; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1316 & 1322. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Moldenke, Fifth Summ. 1: 57 & 75 (1971) and 2: 658, 682, & 913. 1971.

Cory reports this species "frequent on grounds of tennis courts" in Cameron County, Texas. The corollas are described as "purple" on Rzedowski 7309 and as "blue" on Martínez-Calderón 1246. The plant has been collected in fruit in November (in addition to the other months previously reported).

Additional citations: TEXAS: Cameron Co.: Cory 51353 (Mi). MEXICO: San Luis Potosí: J. Rzedowski 7309 (Ac). Veracruz: González Quintero 278 (Ip); Martínez-Calderón 1246 (Ac).

VERBENA CAMPESTRIS Moldenke

Additional bibliography: Moldenke, Phytologia 13: 186. 1966; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 913. 1971.

VERBENA CANADENSIS (L.) Britton

Additional & emended synonymy: Obletia verbenolacoea Rozier, Introd. Obs. Phys. Hist. Nat., ed. 1, 1: 367. 1771. Verbena americana tubo floris longissimo Rozier, Introd. Obs. Phys. Hist. Nat., ed. 1, 1: 367. 1771. Verbena oblaetia Retz., Svenska Vet. Akad. Stockh. Nya Handl. 34: 143--146, pl. 5. 1773. Glandularia caroliniensis Walt. ex J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2 (2): 920. 1789. Clandularia caroliniensis J. F. Gmel. in L., Syst. Nat., ed. 13, pr. 1, 2 (2): 1555, sphalm. 1789. Verbena aubletia L. apud Steud., Nom. Bot., ed. 2, 2: 749. 1841. Verbena aubletii L. ex Voigt, Hort. Suburb. Calc. 472. 1845. Glandularia canadensis Small apud J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933. Glandularia drummondii Small apud J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933. Glandularia lamberti Small apud J. A. Clark, Card Ind. Gen. Sp. Var. issue 141. 1933. Verbena aubketia Jacq. ex Jacobs & Burlage, Ind. Pl. N. C. 251, sphalm., in syn. 1958. Verbena drummondii Grey ex Jacobs & Burlage, Ind. Pl. N. C. 251, in syn. 1958. Glandularia canadensis L. Small ex Poindexter, Trans. Kans. Acad. Sci. 65: 419, in syn. 1962. Verbena frummondii Baxt. ex Moldenke, Résumé Suppl. 3: 42, in syn. 1962. Verbena canadeusis (L.) Britton ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena canadensis var. canadensis Croat ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena canadensis var. canadensis f. canadensis Croat ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969. Verbena canadensis var. atroviolacea Dermen ex Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:]

1323. 1970. Verbena canadensis var. grandiflora (Haage & Schmidt) Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1323. 1970. Verbena canadensis var. lamberti (Sims) Thell. ex Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1323. 1970. Verbena canadensis var. compacta Dermen ex Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1323. 1970. Verbena canadensis atroviolacea Dermen apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970. Verbena canadensis grandiflora (Haage & Schmidt) Moldenke apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970. Verbena canadensis drummondii (Lindl.) Bxt. apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970. Verbena canadensis lamberti (Sims) Thell. apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970. Verbena canadensis compacta Dermen apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970. Verbena canadensis H.B.K. ex Moldenke, Fifth Summ. 2: 658, in syn. 1971. Verbena canadensis (L.) Butt. ex Moldenke, Fifth Summ. 2: 658, in syn. 1971. Verbena canadensis (O.) Britton ex Moldenke, Fifth Summ. 2: 658, in syn. 1971. Verbenna drummondii Bxt. ex Moldenke, Fifth Summ. 2: 708, in syn. 1971.

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Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Solbrig, Princ. & Meth. Pl. Biosyst. 44 & 112. 1970; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 94, 96, 97, & 599, fig. 3558. 1970; Cain, Found. Pl. Geogr., pr. 2, 335. 1971; E. R. Hall, Am. Forests 77 (12): 17. 1971; Zochert, Nat. Hist. 80 (10): [8]. 1971; Moldenke, Fifth Summ. 1: 17, 19, 21--23, 25, 27, 30, 32--34, 36--41, 43, 45, 47, 49, 51, 53, 58, 61, 204, 205, 370, 390, 396, 397, 402, & 421 (1971) and 2: 521, 523, 568, 575, 649, 651--654, 656--659, 661, 664, 666, 672, 678, 679, 681, 684, 686, 692, 693, 700, 702, 708, 776, 792, & 913. 1971.

Additional & emended illustrations: Rozier, Introd. Obs. Phys. Hist. Nat., ed. 1, 1: 369, pl. 2, fig. 1--7 (1771) and ed. 2, 1: 369, pl. 2, fig. 1--7. 1777; Britton & Br., Illustr. Fl., ed. 1, 3: 72, fig. 3063 (1898) and ed. 2, pr. 1, 3: 97, fig. 3558. 1913; Blossfeldt, Art Forms Nature pl. 39. 1929; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 97, fig. 3558 (1936), ed. 2, pr. 3, 3: 97, fig. 3558 (1943), and ed. 2, pr. 4, 3: 97, fig. 3558. 1947; Embarger in Chadeaud & Embarger, Traité Bot. 2: 829, fig. 1175. 1960; Yotaro, Gard. Pl. World 3: pl. 64, fig. 1 [in color]. 1966; Rickett, Wild Fls. U. S. 2 (2): [463], pl. 170 [in color]. 1967; W. C. Grimm, Recog. Flow. Wild Pl. 229. 1968; Rickett, Wild Fls. U. S. 3 (2): [361], pl. 109 [in color]. 1969; Khoshoo & Arora, Chromosoma 26: 261 & 262, fig. 2 & 6. 1969; Britton & Br., Illustr. Fl., ed. 2, pr. 5, 3: 97, fig. 3558. 1970; P. Duncan in E. R. Hall, Am. Forests 77 (12): 17 [in color]. 1971; Zochert, Nat. Hist. 80 (10): [8] (in color). 1971.

Recent collectors describe this species as a rhizomatous perennial to 12 inches tall. The corollas are described as "blue-purple" on Brick 14, "rose" on Sykes 7/66, "pink-lavender" on Cronquist 4238, "deep-purple" on F. G. Meyer 2148, and "purple" on Hess & Harrison 1023. The species has been found growing in wet wooded areas, old fields, creek bottoms, pinewoods, ridge thickets, and limestone quarries, in dry rocky limestone-clay soil or reddish clay-loam, on limestone cliffs, rocky ridges, rocky hillsides, rocky open slopes, and prairies. Lowe (1921) states that it grows in dry sandy soil and dry prairie regions in Mississippi. In Kansas it was found by Croat in annually mowed native prairies with limestone outcrops, while Rosson found it in Eddy County, New Mexico, growing in riparian influence on the Chihuahuan desert. In Texas it was found by Brick to be occasional in sandy loam (Dallas County), while Hess & Harrison describe it as "common in disturbed areas of pine-oak forest" (Morris County), Stroud encountered it "in full sunlight in barditch" (DeWitt County), Mears found it growing in association with Astragalus, Berchemia, and Crataegus, and Parks describes it as "frequent on prairies, in open woods, red clay" (Wood County). Moore (1965) records it from Yell County, Arkansas, and Meyncke (1885) from Franklin County, Indiana.

Bartram (1791, 1794) describes a Verbena from the Baton Rouge area as "here is likewise a new and beautiful species of Verbena,

with decumbent branches and lacerated deep green leaves; the branches terminate with corymbi of violet blue flowers, this pretty plant grows in old fields where there is good soil." Ewan feels that this description refers to V. tenuisecta Briq., but I seriously doubt whether this South American species was introduced in Louisiana "in old fields" as early as 1791. I would judge, rather, that the reference is to V. canadensis, which has the "lacerated" leaves.

It is worth noting here that Walter's original description of this plant is "ANONYMOS caroliniensis caule procumbente, foliis laciniatis, floribus spicatis purpureis".

Additional common names recorded for V. canadensis (besides those noted by me in previous installments of this series of notes) are "Aublet's verberna", "garden verberna", "large-flowered vervain", "lazo de amor", and "prairie verberna". Carleton (1962) records the name "Rock-Mountain-vervain" under the synonymous binomial, V. montana, while Yotaro (1966) calls it the "aubletien-Eisenkraut".

Elmore (1944) avers that "It is irritating to the skin".

Thornberry (1966) records the fungi Puccinia vilfae Arth. & Holw. (a rust) as attacking Verberna canadensis in Oklahoma and Septoria verbenae Rob. (a leaf-spot) in Kansas, Louisiana, and Oklahoma; Hirata (1966) adds Erysiphe cichoracearum P. DC. (a powdery mildew).

Radford, Ahles, & Bell (1964) state that Verberna canadensis occurs along roadsides and on sandhills in widely scattered localities in the piedmont and central parts of the Carolinas, flowering there from March to May. Swink (1969) says "This is a commonly cultivated garden flower, and these collections [from Berrien and Kane Counties, in the Chicago area] may represent escapes from cultivation". Khoshoo & Arora (1969) describe what they call a hybrid between V. aubletia and V. tenuisecta -- presumably what is now called xV. wingei Moldenke. They give $n = 15$ as the chromosome count for what they call V. aubletia and aver that it forms bivalents during meiosis.

The Rozier work cited in the synonymy and bibliography was originally published in November, 1771. It was reprinted with original pagination and original dates in 1777 [perhaps also in 1773, according to some bibliographies]. It is sometimes cited to "Journ. de Physique" because that is what the continuation of the series was entitled from 1794 to 1823. From 1773 to 1793 it was entitled "Observ. & Mém. Physique". The article in question starts out as follows: "Description de la verveine d'Amérique. Cette plante n'a encore été décrit par aucun Auteur: elle a été démontrée cette année au jardin du Roi, sous la dénomination de verbenna Americana tubo floris longissimo. M. Lemonier en a reçu la graine, il y a environ trois ans de l'Amérique Septentrionale, dans les terres de miclos. Il en a fait un genre particulier, sous le nom d'obletia verbenolacoea. La Botanique Française doit beaucoup à M. Oblet, & il a enrichi le jardin des plantes d'une quantité de

semences précieuses, qu'il a rapportées de Cayenne & de l'isle de France. Ce Botaniste zélé & savant nous a fait connoître des deux espèces de zinnia pauci & multi flora; il étoit juste de donner son nom à une plante aussi intéressante que celle que nous allons décrire. L'obletia est une plante vivace; on la conserve l'hiver dans l'orangerie: nous pensons que peu-à-peu on l'acoutumera à rester en pleine terre. Sa beauté la rend l'ornement d'un jardin, & elle réunit à la beauté, l'avantage d'être en fleur un très-grande partie de l'année." This is followed by a long and detailed description of the plant and an excellent illustration of it.

Lázaro e Ibiza (1921) describes the plant as it grows in Spain: "Hojas oblongas, angostadas en pecíolo, con 3 lacinias hendido-dentadas; brácteas lanceoladas, mitad que el cáliz; corola lilácea, con tubo doble largo que el cáliz, y lóbulos escotados. Fl. verano. América del Norte." His statement that the bractlets are only half as long as the calyx is curious, because this is not true of typical V. canadensis, nor of the commonly cultivated xV. hybrida Voss.

Herbarium material of V. canadensis has been misidentified and distributed in some herbaria as V. hastata L. On the other hand, the J. M. Coulter s.n. [May 17, 1873], distributed as V. canadensis, is actually V. ambrosifolia Rydb., Higginbotham 14 is V. bipinnatifida Nutt., R. Runyon 2497 is V. ciliata var. longidentata Perry, R. Runyon 2625 is V. delticola Small, and Toumey 305 is V. gooddingii var. nepetifolia Tidestr.

Additional citations: NORTH CAROLINA: Rutherford Co.: C. R. Bell 2109 (N). GEORGIA: Putnam Co.: Cronquist 4238 (Mi). FLORIDA: Duval Co.: G. H. M. Lawrence 193 (Se--120909). Jefferson Co.: Light-hipe s.n. [March 13, 1891] (N). TENNESSEE: Rutherford Co.: Sharp & Shanks 439 (Se--99271). KANSAS: Anderson Co.: Croat 1567 (N). Osage Co.: Stephens 30597 (N). MISSOURI: Jefferson Co.: F. G. Meyer 2148 (Au--121897). Saint Louis Co.: F. C. Prince 253 (Au--121874). Taney Co.: Demaree 59777 (Ac). ARKANSAS: Baxter Co.: Demaree 28934 (Au--121878), 28944 (Au--121879), 28971 (Au--121881). Benton Co.: Small & Wherry 12351 (N). Faulkner Co.: Demaree 5948 (N), 5962 (N). Fulton Co.: Demaree 25864 (Au--121877). Hot Spring Co.: Demaree 14878 (Se--202948). Lawrence Co.: Demaree 25957 (Au--121880). Marion Co.: Demaree 30110 (Au--121875). Saline Co.: Demaree 57603 (Rf). LOUISIANA: Ouachita Par.: R. D. Thomas 6516 (N). Rapides Par.: J. K. Small s.n. [Lena, May 1931] (N, Rf), s.n. [Between Alexandria and Burkie, May 1931] (N, N. Rf). OKLAHOMA: Atoka Co.: Hopkins, Nelson, & Nelson 1080 (Se--136588). Comanche Co.: Hopkins, Nelson, & Nelson 965 (Se--136590). Harper Co.: W. F. Flint s.n. [1.6.79] (N). Haskell Co.: G. Bryan 178 (1k). Johnston Co.: Hopkins, Nelson, & Nelson 1024 (Se--

136586). Kay Co.: Flickinger 419 (Au--121873). McCurtain Co.: ElSharkawi 54 (Lk); Hess & Seibert 669 (Se--226096); Lindzey 253 (Au--121876). Payne Co.: P. Jones 31 (Lk). Pontotoc Co.: G. T. Robbins 2335 (Se--153536). TEXAS: Chambers Co.: Mears 1305 (Au--258151). Dallas Co.: Brick 14 (Lk). DeWitt Co.: Stroud S.23 (Lk). Jasper Co.: Cory 52728 (Mi), 52864 (Mi). Kendall Co.: H. B. Parks 29520 (Se--184829). Morris Co.: Hess & Harrison 1023 (Au--256823). Newton Co.: Cory 52606 (Mi). Wood Co.: Mears 1221 (Au--258338); F. Parks 50 (Lk). NEW MEXICO: Eddy Co.: Rosson 1317 (Lk). CULTIVATED: New Zealand: W. R. Sykes 7/66 (Nz--169714). North Carolina: Foust s.n. [10/25/1937] (N).

VERBENA CANADENSIS f. CANDIDISSIMA (Haage & Schmidt) Palmer & Steyerl.

Additional synonymy: Verbena canadensis candidissima (Haage & Schmidt) Palmer & Steyerl. apud Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970.

Additional bibliography: Moldenke, Phytologia 13: 187. 1966; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1316 & 1323. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Moldenke, Fifth Summ. 1: 43, 45, 58, & 370 (1971) and 2: 653, 658, 659, 784, & 913. 1971.

Stephens found this form growing in dry rocky limestone soil.

Additional citations: KANSAS: Chautauqua Co.: S. Stephens 30120 (N).

VERBENA CANESCENS H.B.K.

Additional & emended synonymy: Verbena canescens Humb. & Bonpl. ex Steud., Nom. Bot., ed. 1, 873. 1821. Verbena canescens H.B.K. ex Moldenke, Fifth Summ. 2: 659, in syn. 1971.

Additional bibliography: Steud., Nom. Bot., ed. 1, 873. 1821; Burkart, Excerpt. Bot. A.5: 586. 1962; Hocking, Excerpt. Bot. A.6: 91 (1963) and A.9: 367. 1965; Marroquin, Cuad. Inst. Invest. Cient. 14: 30 & 56. 1968; Moldenke, Phytologia 16: 185--186 & 215. 1968; Moldenke, Résumé Suppl. 16: 2 (1968) and 17: [1]. 1968; Rickett, Wild Fls. U. S. 3 (2): 365. 1969; El-Gazzar & Wats., New Phytol. 69: 458, 483, & 485. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1315, 1316, & 1321--1322. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Moldenke, Fifth Summ. 1: 51, 58, & 75 (1971) and 2: 659--661, 684, 694, 767, 769, & 913. 1971.

Additional illustrations: El-Gazzar & Wats., New Phytol. 69: 458, fig. 7. 1970.

Rickett (1969) describes this species as "rather low, not more than a foot tall [actually it grows to 18 inches tall], with many square, hairy branches spreading sidewise. The leaves are toothed, with a stalk or a narrow part which may extend around the stem;

they are hoary. The spikes are mostly single. The corolla ranges from pink to purple, up to 1/4 inch across." He gives its flowering season in Texas as "March to October" and its habitat as "in sandy and rocky soil in open ground and woodland throughout Texas and in northern Mexico." Actually, this is the common Mexican form, rare in Texas, while var. roemeriana (Scheele) Perry is the common Texan plant.

Recent collectors have found V. canescens along roadsides, on wooded slopes of pinyon-oak, in dry rocky shrubby rangeland, flat alluvial land with halophytic Prosopis vegetation, matorral of Cordia boissieri, zacatal vegetation, and in hard, caliche, or fertile dark loamy soil, ascending to 3000 meters altitude. Cruz Cisneros found it on alluvial banks with Hilaria cenchroides, Bouteloua hirsuta, and Erioneuron avenaceus and "in pastizal de Hilaria cenchroides y Bouteloua radicata" in Mexico, where Rzedowski found it growing on "ladera caliza con vegetación de zacatal con arbustos" and in "ladera caliza con vegetación primitiva destruida", while González Quintero encountered it on "ladera caliza con vegetación espaciada". In Coahuila it is said by Runyon to be "common on mountainsides", while Boke & Massey found it "infrequent along roadsides in pinyon-juniper woodland". In Nuevo León it is "abundant in dry gravel soil", according to Stuessi, and "in open pine forests, gypsum soil, scattered along ravines" by McGregor and his associates. Marroquin (1968) cites Alanís 172 & 189 (FCB 2486 & 2487) from the same state.

The corollas of Verbena canescens are described as "purple" on Rosas R. 856 and Runyon 1321, "blue-purple" on Rzedowski 4251, and "blue" on Boke & Massey 222, Latorre 2, and Rzedowski 24811.

It should be noted that F. W. Gould 10656 seems to be a mixture with var. roemeriana (Scheele) Perry. It has been suggested that the C. L. Smith 221 specimen in the herbarium of the University of California may represent V. pinetorum Moldenke, but I have re-examined it and am still of the opinion that it is typical V. canescens H.B.K.

Material of V. canescens has been misidentified and distributed in some herbaria as V. bracteata Lag. & Rodr. On the other hand, the Ravenel s.n. [Rome, Ga.], distributed as V. canescens, is actually V. bracteata Lag. & Rodr., H. B. Parks s.n. [College Station, 6-7-47], and Stanford, Lauber, & Taylor 2174a & 2252 are V. canescens var. roemeriana (Scheele) Perry, J. Rzedowski 11265 is V. gracilis Desf., González Quintero 1265 is V. menthaefolia Benth., Paxson & Barkley 16M839 is V. pinetorum Moldenke, N. C. Henderson 63-153 & 63-198 are V. plicata Greene, and C. M. Rowell 11228 is V. racemosa Eggert.

Additional citations: TEXAS: Hidalgo Co.: Fleetwood 7087 (Aug--230983). MEXICO: Aguascalientes: J. Rzedowski 25068 (Ip, Mi). Chihuahua: F. Robert s.n. [26-I-1966] (Ip). Coahuila: Boke & Mas-

sey 222 (Mi); Fuentes C. s.n. [20/IX/1959] (Ip); F. W. Gould 10656, in part (Ip); Latorre 2 (Au--225449); E. G. Marsh 575 (Au--212499), 1133 (Au--212931), 1687 (Au--213491); E. M. Marsh 2140 (Au--213876); R. Runyon 1321 (Au--269761). Federal District: Bopp O. 213 (Ip). Hidalgo: González Quintero 2876 (Ip), 3081 (Ac). México: Cruz Cisneros 691 (Mi), 959 (Mi). Nuevo León: Alanís F. 172 (Ip); Fuentes C. s.n. [23.IX.1959] (Ip); H. Hernández s.n. [18/V/1965] (Ip); McGregor, Harms, Robinson, Rosario, & Segal 98 (N, W--2526794); Roybal 97 (Au--121976); Stuessy 262 (Au--252934). Oaxaca: C. L. Smith 221, in part (Ca--975386, Ip). San Luis Potosí: R. L. McGregor 16644 (N); J. Rzedowski 3562 (Ip), 3569 (Ip), 4251 (Au--244592), 6347 (Au--243666), 6520 (Ip), 10225 (Ip), 24811 (Ip, Mi, Mi), 24834 (Ip). Tamaulipas: R. Runyon 5740 (Au--270307). Veracruz: M. Rosas R. 856 (Ac).

VERBENA CANESCENS f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 15: 494. 1968; Moldenke, *Fifth Summ.* 1: 75 (1971) and 2: 913. 1971.

VERBENA CANESCENS var. ROEMERIANA (Scheele) Perry

Additional bibliography: Hocking, *Excerpt. Bot. A.* 6: 91. 1963; Marroquin, *Cuad. Inst. Invest. Cient.* 15: 56. 1968; Moldenke, *Phytologia* 16: 186 & 215. 1968; Moldenke, *Résumé Suppl.* 16: 2 (1968) and 17: [1]. 1968; Moldenke in Correll & Johnston, *Man. Vasc. Pl. Tex.* [Contrib. Tex. Res. Found. Bot. 6:] 1315, 1316, & 1322. 1970; Correll & Johnston, *Man. Vasc. Pl. Tex.* [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Moldenke, *Fifth Summ.* 1: 58, 65, & 75 (1971) and 2: 659--661, 693, 702, & 913. 1971.

Runyon describes this plant as having "leaves oblong in outline, incised, hispid or rough, or imperfectly lobed, bark green, roots fibrous, fruit a small capsule, frequent in clay soil on clay slopes and hillsides in Hidalgo and Starr Counties [Texas]", flowering there from April to June; he comments also that "it occurs in dry situations throughout the Lower Rio Grande Valley, it prefers clay soil".

Other collectors have found the plant growing in sandy loam, in thorn scrub, along roadsides, and, according to Thomas, in rocky channels leading into dry lakes. Rowell describes it as occasional in rocky limestone soil in Brewster County, Texas. Marroquin (1968) cites Johnson & Barkley 16044M (FCB 102) and Painter, Lucas, & Barkley 14276 (FCB 103) from Neuvo León, Mexico. It has also been collected in anthesis in December and in fruit in July, August, and December, in addition to the months previously reported by me. The corollas are said to have been "blue" on R. Runyon 2733, "lavender" on J. H. Thomas 8185, and "pale-purple" on C. M. Rowell 5113. The Stanford, Lauber, & Taylor 2174a collection looks very much like V. neomexicana (A. Gray) Small, while Hinckley 4004 looks like it might be a hybrid between V. canescens var. roemeriana and V. neomexicana or one

of its varieties, like the unnumbered collection of the same collector and same date of collection previously reported on by me.

Material of V. canescens var. roemeriana has been misidentified and distributed in some herbaria as V. bracteata Lag. & Rodr. On the other hand, the Cruz Cisneros 691, Fuentes C. s.n. [20/IX/1959] & s.n. [23.IX.1959], and J. Rzedowski 3552, 3569, & 10225, distributed as var. roemeriana, seem to be typical V. canescens H.B.K.

Additional citations: TEXAS: Brazos Co.: H. B. Parks s.n. [College Station, 6-7-47] (Sd--65949). Brewster Co.: Hinckley 4004 (N), 4614 (N); C. M. Rowell 5113 (Lk). Brown Co.: Beson & McCart 9335 (Au--247752); S. L. Clark II.17 (Au--247751). Cameron Co.: R. Runyon 2518 (Au--268714). Coleman Co.: B. E. Holland 21 (Au--248096). Hidalgo Co.: R. Runyon 2733 (Au--268734). Kerr Co.: F. W. Gould 8260 (Lk). Kinney Co.: Strother 264 (Au--238208). Pecos Co.: Ballinger s.n. [October 24, 1959] (Au--220905). Terrell Co.: G. L. Webster 453 (Au--122356). Travis Co.: Mears 1031 (Au--255142). Uvalde Co.: Atwood 2008 (N). MEXICO: Baja California: J. H. Thomas 8185 (Ip). Coahuila: F. W. Gould 10656, in part (Au--236900); E. G. Marsh 1792 (Au--213575). Nuevo León: Reséndez 55 (Au--222207); Webster, Adams, Miller, & Miller 11154 (Au--262634). Tamaulipas: Stanford, Lauber, & Taylor 2174a (Se--147695), 2252 (Se--149141).

VERBENA CANIHUENSIS Moldenke

Synonymy: Verbena canihuensis Moldenke, Fifth Summ. 2: 659, in syn. 1971.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Moldenke, Phytologia 13: 246. 1966; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 660 & 913. 1971.

Hatschbach describes this plant as creeping and rooting, with lilac flowers, growing at the edges of gallery forests, at altitudes of 760 to 800 meters. He refers to his no. 20177 as a "topotype",

Additional citations: BRAZIL: Paraná: Hatschbach 20177 (N), 22284 (Mi, N).

VERBENA CAROLINA L.

Additional & emended synonymy: Verbena polystachya H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 222. 1817 [not V. polystachya Jepson, 1947]. Verbena biserrata H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 222. 1817. Verbena veronicaefolia H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 222--223. 1817 [not V. veronicaefolia J. E. Sm., 1845]. Verbena biserrata Humb. & Bonpl. ex Steud., Nom. Bot. Phan., ed. 1, 873. 1821. Verbena polystachya Humb. & Bonpl. ex Steud., Nom. Bot. Phan., ed. 1, 873. 1821. Verbena veronicaefolia Humb. & Bonpl. ex Steud., Nom. Bot. Phan., ed. 1, 874. 1821. [to be continued]